TIMAEUS

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Conclusion

SOCRATES: One, two, three—but, Timaeus, my friend, where's 17a
the fourth of yesterday's guests* who were to treat me today?

TIMAEUS: He was taken ill, Socrates. He wouldn't have missed our meeting if he could have helped it.

SOCRATES: Then it's up to you and our friends here to fill in for the absentee too, isn't it?

TIMAEUS: Of course. We'll do the best we can to make up for b
him. It wouldn't be right for us not to do our best to repay your hospitality towards us yesterday, when you did everything a host should do for his guests.

SOCRATES: And do you remember the assignment I set you and the topics you were to address?

TIMAEUS: Only partly,* but you're here to remind us of any we've forgotten. Or rather, if it's not too much trouble, why don't you quickly run back over them, from start to finish, so that they lodge in our minds better?

SOCRATES: All right. I suppose the most important of the issues c
I raised yesterday was the political one,* when I explained my views on what the best kind of constitution might be and what kind of citizens should make up such a state.

TIMAEUS: Yes, Socrates, and the political system you described met with our wholehearted approval.

SOCRATES: Didn't we begin by distinguishing within the citizen body between artisans such as farmers and those who fight in their defence?

TIMAEUS: Yes.

SOCRATES: And since we were assigning to each person (along natural lines, of course) just one occupation, one branch of d
expertise—the one that suited each individual in himself—we said that those whose job it was to defend everyone were to do nothing more than be guardians of the city against threats of harm from both outside and inside. They were to

deal gently but justly with their subjects and their natural
18a friends, and severely with those of their enemies who confronted them on the battlefield.

TIMAEUS: Absolutely.

SOCRATES: Yes, because we said, I think, that the guardians had to have a specific temperament, combining exceptional passion with exceptional love of knowledge, to enable them to treat each group with gentleness or severity, as the occasion demanded.

TIMAEUS: Yes.

SOCRATES: And what about their upbringing? Didn't we say that both their bodies and their minds were to be trained, and that they were to study all the subjects appropriate to them?

TIMAEUS: Yes.

b SOCRATES: And we also said that people brought up in the way we prescribed were never to regard gold, silver, or any other material possessions as their own. Like professional soldiers, they were to be paid for their protection by those they kept safe, but the rate of pay was to be commensurate with modest needs, they were to pool their resources, and they were to live communally with one another, free from all other occupations and with excellence their only concern.

TIMAEUS: Yes, so we did.

c SOCRATES: Then we also touched on the question of the female guardians, and said that their characters were to be made to match the men's more or less exactly, and that in every aspect of life, including warfare, all the women were to be assigned all the same tasks as the men.

TIMAEUS: Yes, that's right too.

SOCRATES: And what about procreation? Not that we could easily forget what we said on this topic, since it was so unusual. We stipulated that no marriages were to be exclusive and that children were to be shared by all the guardians, and we found ways to make sure that none of them would ever recognize a child as his own. Instead, everyone would consider
d everyone else his relative — those from the appropriate age-group as sisters and brothers, those from previous generations

as their parents and grandparents, and those from the generations below them as their children and grandchildren.

TIMAEUS: Yes, that's right. There's no difficulty remembering *that*.

SOCRATES: Then again, we had to try to guarantee their excellence right from the moment of their birth, and in order to achieve this we said — I'm sure you remember — that, when it came to bringing people together for sex, our male and female rulers had to make secret use of 'lotteries' to ensure e
that bad men and good men would each be paired exclusively with women of the same type. In this way, the measures would arouse no resentment, because they would think that their partner had been chosen for them by chance.

TIMAEUS: How could we forget?

SOCRATES: And we went on to say, didn't we, that the children 19a
of good couples were to be brought up, while the children of bad couples were to be quietly sent away to other parts of the city? But we added that the rulers had to be constantly vigilant while these children were growing up, so that they could re-promote those who deserved it and have their places taken instead by those from among their own number who had turned out not to deserve their high rank.

TIMAEUS: Yes.

SOCRATES: So, Timaeus, my friend, have we now covered yesterday's conversation,* or at least gone back over the main points? Is there anything missing, anything we still need to recall?

TIMAEUS: No, that was exactly how the conversation went, b
Socrates.

SOCRATES: I'd like you next to hear how I feel about the constitution we described. The best way I can describe the feeling is to compare myself to someone who had gazed on beautiful creatures at rest (either in a picture or real, living creatures*) and conceived the desire to see them in motion, exercising in competition some aspect of what he imagined to be their physical nature. That's how I feel about c

the constitution we described: I'd like to hear from someone an account of our city contending against others in typical inter-city contests. I'd like to hear how it does itself proud as it goes to war,* and how in wartime its citizens display qualities appropriate to their education and upbringing, not only in their military achievements, but also in the way they go about negotiating with other cities.

d Anyway, Critias and Hermocrates, I'm aware that I personally would never be capable of delivering an adequate eulogy of the city and its citizens in these respects.* Now, while this might be hardly surprising in my case, I've come to hold the same opinion about the poets too — poets of past times, as well as our contemporaries. I don't mean any disrespect to poets in general, but it's obvious to everyone that while imitators as a breed have the greatest facility and expertise at reproducing things they've been brought up on, none of them finds it easy to reproduce on stage anything
e that falls outside his experience, and they find it even less easy to put such a thing into words. As for the sophists,* I believe them to be true experts at making all kinds of wonderful speeches on other subjects, but I'm afraid that, perhaps because they roam from city to city without having made homes for themselves in one particular place, they miss the mark when it comes to describing the many different kinds of things that men who are both philosophers and statesmen achieve in the real world in warfare and on the battlefield, and put into words in their negotiations with other individuals.

That leaves only people with *your* qualifications,* people
20a supplied by both nature and nurture with philosophical and statesmanlike characters. Timaeus here, for instance, comes from Italian Locri, an exceptionally well-governed city, where his high birth and great wealth surpass those of any of his compatriots, and where he's been chosen for the most important political offices and posts; and yet at the same time he has gone as far as anyone can, in my opinion, in all intellectual endeavours. As for Critias, all of us here in Athens know

that he's no amateur in any of the fields in question. Then there's Hermocrates, whose natural and nurtured competence in all these respects is vouched for by a large number of reliable witnesses.

Even yesterday I was bearing all this in mind, and that b
was why I did all I could to satisfy your request that I should describe the constitution. I knew that no one could address the next topics more competently than you, if you agreed to do so, because you were the only people alive today who, now that we've equipped the city with everything suitable for warfare, could go on to display all its qualities. That was why, once I'd delivered the account I'd been instructed to give, I gave you in your turn the assignment I'm now asking you to carry out. You talked it over among yourselves and agreed to pay me back today with treats in the form c
of speeches, so here I am, all dressed up for the occasion, and no one could be more ready than I am to receive your hospitality.

HERMOCRATES:* Well, Socrates, we are, as Timaeus here told you, fully committed to the project, and in any case what excuse could we offer for not doing as you say? As a result, even yesterday this was exactly the issue we began to think about as soon as we'd returned from here to the guest-quarters of Critias' house, where we're staying. Actually, the conversation started even earlier, while we were still en route there. Anyway, Critias here brought up a story from ancient d
times—but why don't you tell Socrates about it now, Critias, to enable him to judge whether or not it's relevant to the task he's set us?

CRITIAS: Yes, I'd better do so, if the third member of our team agrees. Timaeus?

TIMAEUS: I do.

CRITIAS: All right, then. Socrates, you're about to hear a story which, for all its strangeness, is absolutely true,* with its truth affirmed by Solon, the wisest of the seven sages.* e
Now, Solon was a relative of my great-grandfather Dropides,

and the two of them were very close, as Solon himself often says in his verses.* Dropides told the story to my grandfather Critias and the old man used to repeat it to us in his turn. He used to tell us that long ago Athens had performed impressive and remarkable deeds, but they had been consigned to oblivion by time and the destruction of human life.* One of these exploits was especially impressive, and recalling it now
21a will be a suitable way not only to repay our debt to you, but also to praise the goddess on the occasion of her festival* with a truthful hymn, so to speak, as she deserves.

SOCRATES: That sounds good. So then, what was it Critias told you? What did he hear from Solon? What was this achievement that was no mere story, but something our city really did, long ago?

CRITIAS: I'll tell you. I heard the ancient tale from a man who was no youngster himself, since Critias was, by his own reck-
b oning, getting on for ninety years old by then, while I was ten at the most. It was the Koureotis of the Apatouria,* and the usual children's event, which happens every time the festival is held, took place then too — which is to say that our fathers set up a recitation contest. Poems aplenty by poets aplenty featured in the recital, but many of the children sang Solon's verses, because they were new then.

One of the members of our phratry remarked (it might just have occurred to him, or he was just trying to please
c Critias) that Solon was not only a great sage in general, but, where his poetry was concerned, was more independent than any other poet. The old man, as I recall, was delighted with this and said with a smile: 'Yes, Amynander, but if only he'd not taken up poetry merely as a hobby, but had worked as seriously at it as other poets do! And I wish that he'd finished the story he brought back from Egypt, and hadn't been forced to neglect it by the feuding and other evils he found here when he got home. If he had, I dare say that he'd
d have become more famous as a poet than Hesiod, Homer, and all the rest.' 'What story was that, Critias?' asked Amynander.

'It was about our city's most impressive achievement ever,' Critias replied, 'one which deserves to be better known than any other, but time and the destruction of the people involved have prevented the story from surviving until now.' 'Do please tell us it,' said Amynander, 'from start to finish. What was this story that Solon told? How did he come to hear it? Who told him it was true?'*

'In Egypt,' Critias began, 'around that part of the Delta e
where the Nile forks at its crown, there's a district called the Saïtic province, where the largest city is Saïs, famous as the birthplace of King Amasis.* The founder of this city was a deity whose Egyptian name is Neïth, though in Greek, according to the Egyptians, she is Athena. The inhabitants are very pro-Athenian and claim somehow to be related to us. Solon said that he was heaped with honours on his
arrival there, but the main point of his account was that, 22a
when he once questioned those priests who were experts in history about the past, he discovered how almost completely ignorant about such matters all Greeks were, including himself. Once, he said, he wanted to draw them into a discussion of ancient history, so he launched into an account of the earliest events known here: he began to talk about Phoroneus, who is said to have been the first man, and Niobe; he told
the story of the survival of Deucalion and Pyrrha after the b
flood, and the tales of their descendants; and he tried, by mentioning the years generation by generation, to arrive at a figure for how long ago the events he was talking about* had taken place.

'Then one of the priests, a very old man, said: "Solon, Solon, you Greeks never grow up. There isn't an old man among you."

'"What do you mean?" Solon replied.

'"None of you have mature minds," the priest replied. "You have no ancient tradition to imbue your minds with old beliefs and with understanding aged by time. The reason
for this is that the human race has often been destroyed in c

various ways—as it will be in the future too. Though there have been countless causes of briefer disasters, fire and water have been responsible for the most devastating catastrophes. For instance, you have a story of how Phaethon, scion of the Sun, once harnessed his father's chariot, but was incapable of driving it along the path his father took, and so burnt up everything on the surface of the earth and was himself killed by a thunderbolt. This story has the form of a fable, but it
d alludes to a real event*—the deviation of the heavenly bodies* that orbit the earth and the periodic destruction at long intervals of the surface of the earth by massive conflagrations.

'"In one of these conflagrations, all those people who live in mountainous regions and in places that are high and dry are far more likely to die than those who live by rivers and the sea. The Nile, so often our saviour, saves us at these times from disaster by being released.* But when the gods purge the earth with a flood of water, it is the herdsmen and shepherds in the mountains who are spared, while the
e inhabitants of your cities are swept into the sea by the rivers. Here in Egypt, however, water never rains onto the fields from above—it never has, neither then, nor at any other time. Here it does the opposite: all our water rises up from below.*

'"This explains why the legends preserved here are the most ancient, even though the human race is actually continuous, in larger or smaller numbers, everywhere in the world where neither excessive cold nor excessive heat prevents
23a human habitation. But from long ago every impressive or important or otherwise outstanding event we hear about, whether it happens in your part of the world or here or elsewhere, has been written down here in the temples and preserved. What happens in your part of the world and elsewhere, however, is that no sooner have you been equipped at any time with literacy and the other resources of city life than once again, after the usual interval, a heavenly flood pours down on you like a plague and leaves only those who are
b illiterate and uncivilized. As a result, you start all over again

and regain your childlike state of ignorance about things that happened in ancient times both here and in your part of the world.

'"For instance, Solon, the accounts you gave just now within a genealogical framework of events in your part of the world hardly differ from childish tales. In the first place, you remember just the one deluge when there were many before it, and in addition you're unaware that the noblest and most heroic race in human history once existed in your land. You c and all your current fellow-citizens are the descendants of what little of their stock remained, but none of you realizes it, because for many generations the survivors died without leaving a written record. But in fact there was a time, Solon, before the greatest and most destructive flood, when the city which is now Athens was outstandingly well governed in all respects, and was unrivalled at warfare too. The noblest achievements and the finest political institutions we've ever heard of on earth are attributed to it."

'Solon told us how astonished he was to hear this, and said d that he begged the priests as forcefully as he could to give him next a detailed and thorough account of those fellow citizens of his from long ago. And the priest replied: "I'll do so gladly, Solon, not just for your sake and for Athens, but also and especially for the sake of the goddess who is the patron, nurse, and governess of both our cities. Your city was founded first, when the goddess received your rootstock from Earth and Hephaestus, and ours was founded a thou- e sand years later.* The written records in our temples give the figure of 8,000 years as the age of our culture, so it is Athenians of 9,000 years ago whose customs and whose finest achievement I shall briefly explain to you. You and I will consult the written records on some future occasion, when we have time, and go through them thoroughly, in 24a detail, and in order.

'"It's worth comparing their way of life with ours here, because you'll find many current instances here of customs

that used in those days to obtain in your part of the world. First, we have the priestly caste, which is kept distinct from all the rest; then we have the artisan caste, each member of which — people such as herdsmen, hunters, and farmers — works at his own business, without involvement in anyone
b else's. Then there's the warrior caste and, as I'm sure you've noticed, they're separated off from all the others, required by law to focus exclusively on military matters. Moreover, their weaponry consists of shields and spears, which we were the first in Asia to adopt, following the example of the goddess,* just as you did first in those regions where you Greeks live. As for intellectual attainments, I'm sure you can see how seriously we here have customarily taken the study of the universe, and how the application of its divine
c principles to human affairs has enabled us to discover everything that contributes towards health, up to and including divination and medicine, and to acquire all the related branches of knowledge.

'"The way things are organized and set up here was in fact formerly the way the goddess arranged things among you Athenians, when she founded your state at the time I'm talking about. She chose the region in which you had been born because she realized that the temperate climate there would produce men of outstanding intelligence.* Because
d the goddess loves both war and wisdom, she chose this region as the one that would produce men who would most closely resemble herself and founded a city there first. And so your people began to live there and to adopt customs such as those I've described. In fact, you had an even more stable culture than ours, and your all-round excellence had no rivals, which is hardly surprising since you were the offspring and the wards of gods.

'"Our records contain many impressive and admirable exploits performed by your city, but there's one above all
e that stands out for its importance and courage. Our documents record how your city once halted an enormous force

that was marching insolently against not just the whole of Europe, but Asia as well, from its base beyond Europe in the Atlantic Ocean. I should mention that in those days the ocean there was navigable, since there was an island in front of the strait which, I've heard you say, your people call the Pillars of Heracles.* The island was bigger than both Asia and Libya combined, and travellers in those days used it to get to the further islands, from where they had access to the whole mainland over on the other side, the mainland which 25a
surrounds that genuine sea.* Everything this side of that strait is like a narrow-mouthed harbour, but that is the true sea, and the land which completely surrounds it truly deserves the name 'mainland'.

'"On this island of Atlantis a great and remarkable dynasty had arisen, which ruled the whole island, many of the other islands, and parts of the mainland too. They also governed some of the lands here inside the strait — Libya up to the border with Egypt, and Europe up to Etruria.* Once b
upon a time, then, they combined their forces and set out en masse to try to enslave in one swoop your part of the world, and ours, and all the territory this side of the strait. This was the occasion, Solon, when the resources of your city, its courage and strength, were revealed for all to see; it stood head and shoulders above all other states for its bravery and military expertise. At first it was the leader of the Greek cause, c
and then later, abandoned by everyone else and compelled to stand alone, it came to the very brink of disaster,* but it overcame the invaders and erected a trophy, thereby preventing the enslavement of those who remained unenslaved this side of the boundaries of Heracles and unhesitatingly liberating all the rest.

'"Some time later appalling earthquakes and floods occurred, and in the course of a single, terrible day and night d
the whole fighting-force of your city sank all at once beneath the earth, and the island of Atlantis likewise sank beneath the sea and vanished. That is why the sea there cannot now

be navigated or explored; the mud which the island left behind as it settled lies a little below the surface† and gets in the way."'

There you have it, Socrates. That was a brief version of
e the story told me by old Critias, who heard it from Solon. Yesterday, of course, as I listened to the description you were giving of the constitution and its citizens, I recalled the story I've just told and was surprised to notice how closely your description matched most of Solon's tale, by some miraculous coincidence. But I chose not to say anything straight
26a away, because a lot of time had passed and my recollection of the story was imperfect. I thought it would be better for me first to get the whole thing up to the mark in my own mind before telling it out loud.

So I readily agreed yesterday to the assignment you set us because I was expecting us to be reasonably well placed to propose a theme that suited our purposes, which is always the most difficult thing to find in such cases. To that end, as our friend here told you, as soon as we left here yesterday I began
b to relate the story to them as I recalled it, and after I left them I spent the night going over it until I'd recovered pretty much everything. There's a saying, as you know, that lessons learnt young endure amazingly well. How true it is! Speaking for myself, I'm not convinced that I could recall everything I heard yesterday, but I'm absolutely certain that not the slightest detail of this story has escaped me, even though I heard it such a long while ago. The story amused
c and entertained me at the time I heard it, and the old man enjoyed teaching me it, because I asked him about it again and again, until it became lodged in my mind as securely as painted colours heat-fixed for permanence.* Besides, I began telling our friends here the story at daybreak today, so that they too would have material to contribute to the speech.

So, to get to the point of what I've been saying: Socrates, I'm in a position to tell the story in exact detail, not just the summary version. We shall now proceed to transfer the

citizens and the city you described for us yesterday from your fable into fact and locate that city right here, as Athens; d
we shall claim that your imaginary citizens are in fact our ancestors, the ones the priest spoke about. The match will be so perfect that no discordant note will be struck if we identify your citizens with the men of that past era. We'll divide the task up among us and all do our best to discharge the assignment you set us as we should. What you have to do, then, Socrates, is consider whether this account of ours will meet with your approval, or whether we need to come up with another project instead. e

SOCRATES: How could we prefer any speech to the one you're proposing, Critias? Its relevance to the goddess makes it the perfect speech for the present occasion, her festival, and the fact that it isn't a made-up story but a true historical account* is of course critically important. If we turn down this speech, what are the chances of our coming across others? None at all. So do, please, give your speeches — and I wish you all good luck — while I now relax and listen, instead of being the speaker as I was yesterday. 27a

CRITIAS: See if you approve of how we've divided up our treats for you, Socrates. Since Timaeus knows more than the rest of us about the heavenly bodies and has specialized in natural science,* we decided that he should speak first, and should start with the origin of the universe and end with the creation of human beings. It will be my turn next, and I'll inherit from him the human race as a whole, now created in his speech, and from you* a particular group of exceptionally well-educated humans. Then, in keeping not just b
with Solon's story but also with his legislation, I shall introduce them before us, as if we were a panel of judges, and make them citizens of this city of ours, on the grounds that they are in fact Athenian citizens from an earlier epoch who've been rescued from oblivion by the hieroglyphic record; and from then on we can assume that the people we're talking about are fellow citizens, fellow Athenians.

SOCRATES: It looks as though I shall lack for nothing—as though I'm in for a brilliant feast of words in return for mine of yesterday. Apparently, then, Timaeus, it will be your job to speak next, once you've invoked the gods as custom requires.

c TIMAEUS: Of course, Socrates: anyone with even a slight amount of sense always calls on the gods at the start of any enterprise, great or small. And we are people who plan to talk, somehow, about the creation of the universe, or whether it might even be uncreated, so if we're to avoid going wildly wrong, we really have no choice: we must call on gods and goddesses and pray that our account meets with their approval—with *their* approval above all, but then also
d with ours. As far as the gods are concerned, let this be our invocation; but we also need to call up our own resources, to reduce the chances of any failure of understanding on your part and to enable me to express my thoughts on the matters before us as clearly as possible.

Our starting-point lies, I think, in the following distinction: what is it that always is, but never comes to be, and what is it that comes to be† but never is?* The former, since it is
28a always consistent, can be grasped by the intellect with the support of a reasoned account, while the latter is the object of belief, supported by unreasoning sensation,* since it is generated and passes away, but never really is. Now, anything created is necessarily created by some cause,* because nothing can possibly come to be without there being something that is responsible for its coming to be. Also, whenever a craftsman takes something consistent as his model, and reproduces its form and properties, the result is bound in every case to be a thing of beauty, but if he takes as his
b model something that has been created, the product is bound to be imperfect.

The whole universe or world (or whatever: let it be called by whatever term it finds acceptable)… well, the first question

to be asked about it is the perennial first and fundamental question: did it always exist, in which case it was not created and has no beginning, or has it come to be, in which case there was something that began it in the first place?* It has come to be. After all, it is visible, tangible, and corporeal, and everything with these properties is perceptible, and we have already demonstrated that everything perceptible — which is to say, everything that is grasped by belief with the c support of sensation — is subject to creation and belongs to the class of things that have come to be.

Now, we've already said that anything created is necessarily created by some cause. But it would be a hard task to discover the maker and father of this universe of ours, and even if we did find him, it would be impossible to speak of him to everyone. So what we have to ask is, again, which of those two kinds of model* the creator was using as he constructed the universe. Was he looking at what is consistent 29a and permanent or at what has been created? Well, if this universe of ours is beautiful and if its craftsman was good, it evidently follows that he was looking at an eternal model, while he was looking at a created model if the opposite is the case — though it's blasphemous even to think it. It's perfectly clear, then, that he used an eternal model, because nothing in creation is more beautiful than the world and no cause is better than its maker. The craftsman of this universe, then, took as his model that which is grasped by reason and intelligence and is consistent, and it necessarily follows b from these premisses that this world of ours is an image of something.

It is, of course, crucial to begin any subject at its natural starting-point. Where an image and its original are concerned, we had better appreciate that statements about them are similar to the objects they explicate, in the sense that statements about that which is stable, secure, and manifest to intellect are themselves stable and reliable* (and it's important for statements about such things to be just as irrefutable

c and unassailable as statements can possibly be), while statements about things that are in fact images, because they've been made in the likeness of an original, are no more than likely, and merely correspond to the first kind of statement: as being is to becoming, so the truth of the one kind of account is to the plausibility of the other.* So, Socrates, you shouldn't be surprised if, when discussing gods and the creation of the universe, we often find it impossible to give accounts that are altogether internally consistent in every respect and perfectly precise. We'll have to be content if we come up with statements that are as plausible as anyone else's,* and we should bear in mind the fact that I and all of you, the speaker
d and his judges, are no more than human, which means that on these matters we ought to accept the likely account and not demand more than that.

SOCRATES: Excellent, Timaeus! You're absolutely right:* we must, as you suggest, be satisfied with that. We're impressed and delighted with your preamble, so do please go on to develop your theme.

TIMAEUS: I should explain, then, how this created universe
e came to be made by its maker. He was good, and nothing good is ever characterized by mean-spiritedness over anything; being free of jealousy,* he wanted everything to be as similar to himself as possible. Wise men tell us that there
30a is no more important precondition for the created world than this, and we could not go wrong if we were to accept it. For the god wanted everything to be good, marred by as little imperfection as possible. He found everything visible in a state of turmoil, moving in a discordant and chaotic manner,* so he led it from chaos to order, which he regarded as in all ways better.*

What is perfectly good can accomplish only what is perfectly beautiful; this was and is a universal law. So the god
b took thought and concluded that, generally speaking, nothing he made that lacked intelligence could ever be more beautiful than an intelligent product, and that nothing can have

intelligence unless it has soul. And the upshot of this thinking was that he constructed the universe by endowing soul with intelligence and body with soul, so that it was in the very nature of the universe to surpass all other products in beauty and perfection. This is the likely account, and it follows that we're bound to think that this world of ours was made in truth by god as a living being, endowed thanks to his providence with soul and intelligence.* c

Since this is so, the next question to ask is which living being the maker made the universe in the likeness of.* We're bound to rule out anything condemned by its nature to be partial, because nothing touched by imperfection can ever be beautiful. But we shall affirm that there is nothing more similar than the universe to the whole of which all other living beings, individually and collectively, are parts—that whole which encompasses within itself all *intelligible* living beings, just as this world is made up of us and all other *visible* beings. d For by choosing as his model the most beautiful of intelligible beings, perfect and complete, the god made the world a single, visible, living being, containing within itself all living beings that are naturally akin to it. 31a

Now, we've been speaking of a single universe, but is this right? Or would it be more correct to speak of a plurality, even an infinite plurality,* of universes? No, there can be only one, if it is to have been created by the craftsman-god so as to correspond to its model. For the whole which encompasses all intelligible living beings can never be one of two, with another alongside it, because then there would have to be another living being for them both, of which they both would be parts, and then it would be more correct to speak of this universe as having been made in the likeness of that one, the one that includes both, rather than in their likeness. So, to ensure that this universe of ours resembled the complete and perfect living being in respect of its uniqueness, the maker did not make two or an infinite plurality of worlds, but this world of ours is and always will be a unique creation.* b

Anything created, then, is bound to be corporeal — visible and tangible. But fire is required for the creation of anything visible, and solidity for anything to be tangible, and earth for solidity. It follows that the god began to form the body of the universe out of fire and earth. But it's impossible for any two things to form a proper structure without the presence
c of a third thing; there has to be some bond to mediate between the two of them and bring them together. The best bond is the one that most effectively unifies itself and the things it is joining, and nothing does this better than correspondence. For whenever among three numbers (or, for that matter, three solids or three powers*) one is a mean, such that as the
32a first in the series stands to the mean, so the mean stands to the final number of the series (or, conversely, as the final number stands to the mean, so the mean stands to the first), then the mean can also be treated as first or last (or, alternatively, the first and last terms can be treated as means), and so all of them will of necessity turn out to be identical; and since they are all identical, they are all one.

Now, if for some reason the body of the universe had been created as only a plane surface, without depth, a single mean would have been enough to bind together both the mean
b itself and the other terms involved. In fact, however, solidity was the only appropriate form for the universe, and it always takes two means, not just one, to make a good fit between solid terms. Hence between fire and earth the god placed water and air, and he made them all stand in the same ratio to one another (in so far as that is possible), so that as fire is to air, so air is to water, and as air is to water, so water is to earth; and so he bound together and structured the visible and tangible universe. This was how the body of the universe
c was created from these constituents, four in number, with correspondence making it a concordant whole. And as a result affinity came to be a property of the world, and affinity unified it so thoroughly with itself that it can be taken apart only by him who bound it together.*

The formation of the world occupied each of the four in its entirety; the maker made it out of the totality of fire, water, air, and earth, leaving unused no part or property of any of them. His purpose was to ensure, first, that the world d
should be as complete a living being as it possibly could be, a totality consisting of the totality of its parts. Second, he 33a
wanted it to be one, and so he ensured that there was nothing left over from which another similar universe could be created. Third, he wanted it to be unageing and free from sickness, because he realized that when things that are hot, cold, and so on — things with strong properties — surround a compound body and strike it from outside, they break it up before its time, bring on disease and old age, and waste it away. This was the god's thinking, and this was why and how he ensured that the structure he made was single, a totality consisting of all totalities, complete, unageing, and untroubled by disease.*

The shape he gave it was the one that was both appropriate b
and natural to it. The appropriate shape, for the living being that was to contain all living beings within itself, would be the one that includes all shapes within itself. And so he made it perfectly spherical,* equidistant in all directions from its centre to its extremes, because there is no shape more perfect and none more similar to itself — similarity being, in his opinion, incomparably superior to dissimilarity.*

He gave it a perfectly smooth finish all over, for a number c
of reasons. It had no need of eyes, since there was nothing visible left outside it, nor of ears, since there was nothing to hear either. There was no air around it to require breathing in, nor did it need to be equipped with organs for the intake of food and, once the goodness had been extracted from it, its subsequent evacuation. For there was nowhere for anything that might leave it to go, and nowhere for anything that might come to it to come from. Rather, it fed itself from its own waste and was so designed that every process and action happened within it and by its own agency, since its creator d

believed that the universe would be more perfect if it were self-sufficient than if it needed things other than itself.

Then again, he thought it would be redundant to equip it with hands,* since there was nothing for it to hold or ward off, and equally redundant to fit it with feet or any other means
34a of getting around. It did have motion, but the motion he assigned to it was the one that was natural to its body and that, of all the seven kinds of motion, has the most to do with reason and intelligence. And so he gave it circular movement, by starting it spinning at a constant pace in the same place and within itself. This freed it from the imbalance involved in all the other six kinds of motion,* and since its circular movement did not require feet, he created it without legs and feet.*

So the god who exists for ever took thought for the god
b that was to be,* and for all these reasons he made for it a body that was smooth, uniform, equal in all directions from its centre, and a complete totality, made up of bodies that were also complete totalities. And once he had set in the centre a soul, which he then stretched throughout the body and with which he also coated the outside, he set the body spinning and made it a single, unique universe, capable, thanks to its perfection, of keeping its own company, of needing nothing and no one else, since it was enough for it that it had familiarity and affinity with itself. This, then, was how he created it to be a blessed god.

As for its soul, despite its delayed appearance in this
c account of ours, it was not designed by the god to be younger than the body. How could he have wedded them to each other and then let the older be ruled by the younger? It's just that the things we say reflect the coincidence and contingency that characterize our lives.* But in fact he made soul prior and senior, in terms of both birth and excellence, since it was to be the mistress—the ruler, with the body as its subject. And now I shall explain how he made soul and what materials he used.

He combined the two kinds of substance — the one indivisible and never changing, and the other the divided and created substance of the physical world — into an intermediate, third kind of substance,* and then again, in the case of† both identity and difference, he likewise formed intermediates between, in each case, that aspect of them which is undivided and that aspect of them which is divided in the physical realm. Then he took these three ingredients and made out of them a single, homogeneous mixture, though getting difference to be compatible with identity took force, since difference does not readily form mixtures.* But once he had mixed identity and difference with substance and created a single blend out of the three ingredients, he divided up the whole mixture again, this time into as many portions as he needed, with each portion being a blend of identity, difference, and substance. 35a b

He began the division by first taking a single portion from the mixture; next he took a portion which was double the quantity of the first, and then a third portion, which was one-and-a-half times the quantity of the second and three times the quantity of the first; then he took a fourth portion which was double the quantity of the second, and a fifth which was three times the quantity of the third, and a sixth which was eight times the quantity of the first, and then a seventh portion which was twenty-seven times the quantity of the first.* After this, he filled up the double and triple intervals by cutting off further portions from the mixture and inserting them into the gaps, so that in each interval there were two means, a mean that exceeded one of its extremes by the same fraction of the extremes as it was exceeded by the other extreme, and another mean that exceeded one of its extremes by the same number as it was exceeded by the other extreme.* These links created, within the first set of intervals, further intervals of 3 : 2, 4 : 3, and 9 : 8, and then he filled up all the 4 : 3 intervals with the 9 : 8 interval, leaving in each case a portion, and the portion that remained was an interval whose c 36a b

terms, expressed numerically, were 256 : 243.* And so at this point the mixture, from which he was cutting these portions, was all used up.*

He then split this whole structure lengthwise into two, joined the two halves to each other middle to middle (like
c the letter *chi*, X), bent them round in a circle until they met, and attached each half to itself and to the other at a point opposite their original junction.* He invested them† with the motion that spins at a constant pace in the same place, with one of the rings inside the other; the outer revolution he named the revolution of identity, and the inner one the revolution of difference. He made identity move around towards the right, as if along a side, and difference towards the left, as if along a diagonal, and he gave sovereignty to the
d revolution of identity and constancy. For he left it single and intact, but he sliced the inner one in six places into seven unequal rings,* in conformity with the three double and the three triple intervals. And he ordained that these rings would move in contrasting ways, with three of them being similar in speed,* but the other four moving at rates that differed both from one another and from the other three, while remaining proportionate to one another.

Once the whole structure of the soul had been created to the satisfaction of its creator, he next made the whole corpor-
e eal world inside it, and then joined their centres and fitted them together. Then the soul, which was interwoven throughout the entire fabric from the centre to the furthest limits of the universe, and coated the outside too, entered as a deity upon a never-ending life of intelligent activity, spinning within itself for all time. The soul is invisible (as opposed to the body of the universe, which is visible), and since it is characterized by reasoning and harmony, it is the supreme creation of the
37a supreme intelligible and eternally existing being.

The soul was blended together out of identity, difference, and substance (its three ingredients); the principle of its partition and bonding was rational proportionality; and it circles

back on itself. For all these reasons, when it comes into contact with things, whether their substance is scattered or undivided, it is moved throughout the entirety of its being and it states rationally and precisely with what, in what sense, in b what manner, and at what time anything that is the same as or different from something is the same or different,* and is qualified in either of these ways in relation to both things in the world of creation and to that which is eternally consistent.* The statement that arises and is carried silently and noiselessly along within the self-moving soul is equally true whether it concerns difference or identity, but when its subject is the realm of sensations and it is the ring of difference, moving unerringly, that makes the declaration to the whole of the creature's soul, beliefs and opinions (albeit reliable and true ones) are the result,* as opposed to when the subject of the statement is the realm of reason and when it is the c ring of identity, running smoothly, that makes the declaration, in which case understanding and knowledge cannot fail to follow. But if anyone were to name anything other than the soul as the place where belief and knowledge arise,* he would be completely and utterly wrong.

When the father-creator saw that his creation had been set in motion and was alive, a gift to please the immortal gods, he was pleased and in his joy he determined to make his creation resemble its model even more closely. Since the d model was an ever-living being, he undertook to make this universe of ours the same as well, or as similar as it could be. But the being that served as the model was eternal, and it was impossible for him to make this altogether an attribute of any created object. Nevertheless, he determined to make it a kind of moving likeness of eternity, and so in the very act of ordering the universe he created a likeness of eternity, a likeness that progresses eternally through the sequence of numbers, while eternity abides in oneness.*

This image of eternity is what we have come to call 'time',* since along with the creation of the universe he devised and

e created days, nights, months, and years, which did not exist before the creation of the universe.* They are all parts of time, and 'was' and 'will be' are created aspects of time which we thoughtlessly and mistakenly apply to that which is eternal.* For we say that it was, is, and will be, when in fact only 'is' 38a truly belongs to it, while 'was' and 'will be' are properties of things that are created and that change over time, since 'was' and 'will be' are both changes. What is for ever consistent and unchanging, however, does not have the property of becoming older or younger with the passage of time; it was not created at some point, it has not come into existence just now, and it will not be created in the future. As a rule, in fact, none of the modifications that belong to the things that move about in the sensible world, as a result of having been created, should be attributed to it; they are aspects of time as it imitates eternity and cycles through the numbers.

We use other inaccurate expressions too, such as 'What b has been created *is* what has been created' and 'What is being created *is* being created', and also 'What will be created *is* going to be created' and 'The non-existent *is* the non-existent.' But perhaps now is not the appropriate moment* to cover these matters in detail. In any case, time was created along with the universe, and since they were created together, they will also perish together, if they do ever perish. And the creation of the universe conformed to the model of eternity, so as to c be as similar to it as possible. For the model exists *for all eternity*, while the universe was and is and always will be *for all time*.*

This was how the god reasoned and planned for the creation of time. As a result, in order that time might be created, the sun and the moon and five other heavenly bodies — the so-called planets — were created to determine and preserve the numbers of time.* Once he had made bodies for each of them, he put them into the orbits within the circuit of differ- d ence, seven bodies for seven orbits. He put the moon into the first circle around the earth, he put the sun into the circle

second closest to the earth,* and the Morning Star and the planet which is said to be sacred to Hermes he put into circles with the same speed as the sun, but assigned them tendencies that oppose it.* Consequently, the sun, Hermes' planet, and the Morning Star constantly overtake and are overtaken by one another.* As for the other three planets, a thorough account of where and why he located them as he did would make this supposedly subordinate discussion longer and more troublesome than the main discussion it's meant to be e
serving. There might perhaps be time for a proper explanation of these matters later.

Anyway, when all the heavenly bodies whose shared task it was to produce time had attained their appropriate movements, and when they had been created as living beings, their bodies fastened with bonds of soul, and when each of them had understood its instructions, they began to revolve in conformity with the oblique movement of difference, which 39a
crosses the movement of identity and is subject to it.† The circles they made ranged from larger to smaller, and those with smaller circles revolved faster than those with larger circles. Thanks to the movement of identity, however,† the heavenly bodies with the fastest revolution appeared to be overtaken by those which moved more slowly, though in fact they were overtaking them.* This happens because the faster speed of the movement of identity twists all the orbits into spirals, since they progress simultaneously in two contrasting directions, and so makes the heavenly body that falls b
behind it the most gradually appear to be the closest to us.

In order that there might be a clearly visible way to measure their relative speeds as† they journey on their eight revolutions, the god ignited a light in the circuit that is second closest to the earth, and we have come to call this light the sun. He created it to illuminate as much of the universe as it could and to enable all suitably endowed creatures to become numerate by studying the revolution of identity and sameness. This is how and why night and day were created, which make c

up the circuit of the most intelligent revolution, the undivided one. A month is when the moon has completed a circuit of its circle and caught up with the sun, and a year when the sun has completed a circuit of its circle.

The revolutions of the other heavenly bodies have not been taken into consideration by people, or by so few that they have not been labelled or had their relative speeds examined and measured in numerical terms. This means
d that people in general fail to appreciate that the wanderings of these five planets, which are bewilderingly many and amazingly complex, do constitute time.* All the same, it's still possible to understand that the perfect number of time makes up a perfect year* at the moment when all the eight revolutions, with their relative speeds, attain completion and regain their starting-points when measured against the movement of the ring of identity and sameness. And so this is the reason for the creation of all those bodies which turn as they travel across the heavens: they exist in order that this
e universe of ours might, by imitating the eternity of the perfect, intelligible living being, be as similar as possible to it.

So far, up to the creation of time, the universe had been made in all respects to resemble its model, but there was still a point of dissimilarity: it did not yet contain all living beings, which remained to be created. In carrying out this final task of his, the god, of course, took the model as the exemplar he was to copy. He thought, then, that the universe should contain exactly the same number and kinds of living beings as are discerned by mind within that which is the living being par excellence. And so there are four kinds of living beings in the universe: the heavenly gods, winged
40a creatures that travel through the air, those that live in water, and finally those that go on foot on dry land.

The gods he formed mostly out of fire,* to make them as visible and as beautiful as they could be; he made them spherical, after the fashion of the universe as a whole; he placed them within the movement† of the sovereign ring, to follow

in its train; and he distributed them all around the heaven, to be a true adornment for it, arrayed in complex patterns throughout the whole ring. He endowed each of the gods with two kinds of motion: even rotation in the same place, to enable them always to think the same thoughts about the b same things; and forward motion, under the sovereignty of the revolution of identity and sameness. But with respect to the other five kinds of motion, they were to be stable and unmoving, so that each of them might be, to the fullest extent, as perfect as possible. And so all the fixed stars were created as divine, ever-living beings, spinning evenly and unerringly for ever. And I have already described how those heavenly bodies which turn and wander, in precisely the way the fixed stars don't, were created.

As for the earth, our nurse, winding around†* the axis that had been run straight through the universe, he designed c it to be the preserver and creator of night and day, and the first and eldest of the gods that were created within the universe. But what about the dancing of these gods and the ways they pass by one another? What about the ways their revolutions turn back on themselves and go forward again?* What about which of them come into conjunction and opposition with one another,* and in what order they pass in front of one another, and at what times any of them are veiled from our sight and then reappear,* to frighten those who are capable† of calculation and to send them signs of the future? d To describe all this without visible models* would be labour spent in vain. This will do as an account of the nature of the visible, created gods, so let's end it here.

As for all the other divinities, it's beyond our abilities to understand and explain their creation, so we had better trust the accounts of our predecessors, who were, or so they claim, descendants of the gods and can therefore be expected to know all about their forefathers. There's no way for us not to believe the gods' children, even when what they say is implausible e and illogical;* no, we must follow custom and trust their

claim to be proclaiming matters that are familiar to them. So let's accept their account of the creation of these gods and simply repeat it: Earth and Heaven gave birth to Oceanus and Tethys, who in their turn were the parents of Phorkys, Cronus, Rhea, and all the gods of that generation; then from
41a Cronus and Rhea came Zeus, Hera, and all those well-known beings who are said to be their siblings and who then gave birth to further offspring.*

Once all the gods had been created — both those that traverse the heavens for all to see and those that make themselves visible when they choose — the creator of this universe of ours addressed them as follows: 'Gods, divine works of which I am the craftsman and father, anything created by me is imperishable unless I will it.†* Any bond can be
b unbound, but to want to destroy a structure of beauty and goodness is a mark of evil.* Hence, although as created beings you are not altogether immortal and indestructible, still you shall not perish nor shall death ever be your lot, since you have been granted the protection of my will, as a stronger and mightier bond than those with which you were bound at your creation.

'Now mark my words and apprehend what I disclose to you. Three kinds of mortal creature remain yet uncreated,*
c and while they remain so the universe will be incomplete, for it will not contain within itself all kinds of living creatures, as it must if it is to be perfect and complete. If I were to be directly responsible for their creation and their life, they would have the rank of gods. To ensure that they are mortal, and that this universe is truly whole, it is you who must, in fulfilment of your natures, imitate the power that I used* in creating you and turn, as craftsmen, to the creation of living creatures. Now, there is a part of them that deserves to share with us the title of immortality — the part which is called divine and which rules in those of them who are ever prepared to follow justice, to follow in your train — and it is my job to sow the seed and get the process under way. But then

I shall hand things over and the rest is up to you. Interweave d
the mortal with the immortal, create living beings and give
them their birth; give them food for their growth, and when
they waste away receive them back again.'

After this speech, he turned once more to the bowl he had
used previously to mix and blend the soul of the universe.
He poured into it what was left of the ingredients he had
used before and mixed them in the same way, with the only
difference being that they were no longer as unfailingly pure
as before, but were a grade or two lower in the scale of
purity.* Once he had a complete mixture, he divided it up
into as many souls as there are stars and he assigned each
soul to a star. Then, with each soul mounted on its chariot, e
so to speak, he showed it the nature of the universe. He told
them the laws of their destinies — how it was ordained that
the first incarnation they would undergo would be the same
for all of them, so that none of them would suffer any disad-
vantage at his hands, and how, after he had planted each of
them in the appropriate instrument of time,* they were to be
born as the most god-fearing of creatures. And he explained 42a
that human nature comes in two forms, and that the super-
ior kind was that which would subsequently come to be
called 'male'.*

Because the bodies in which they had been implanted
were inevitably subject to comings and goings, there were,
he went on, certain necessary consequences: the first innate
capacity, shared by them all, would be perception, caused by
the action on them of powerful properties;* the second
would be desire, a mixture of pleasure and pain; the third,
fear and passion, and all the emotions that either follow in b
their train or stand opposed to them. And he explained that
whether they lived moral or immoral lives would depend on
whether they were in control of these things or were con-
trolled by them.* Any soul which made good use of its allotted
time would return to dwell once more on the star with which
it had been paired, to live a blessed life in keeping with its

character; but any soul that fell short would, for its second
c incarnation, become a woman instead of a man.* If under these circumstances it still didn't refrain from wickedness, it would become, on each subsequent incarnation, an animal of a kind determined by the principle that it should resemble the kind of wickedness it displayed. And it would continue to change, with no end to its trials and tribulations, until it had drawn its burdensome mass of fire, water, air, and earth, filled with unrest and irrationality, into alignment with the revolution of identity and sameness within itself—which is
d to say, until it had gained control of this encrustation by means of reason and had re-attained its original, best state.*

Once he had gone through all these decrees for them, which freed him of responsibility for any wickedness any of them might subsequently perform, he set about planting some of them in the earth, some in the moon, and others in the other instruments of time. After this, he handed over to the younger gods the task of forming their mortal bodies. When they had also created any further attributes a human soul
e might require, and whatever went along with such attributes, he left it up to them to govern† and steer* every mortal creature as best they could, so that each one would be as noble and good as it might be, apart from any self-caused evils.

With these arrangements in place, he resumed his life in his proper abode,* while his children attended to their father's orders and set about obeying them. They took the immortal principle of a mortal creature and, in imitation of the craftsman-god who had made them, withdrew from the
43a world, as a temporary loan, portions of fire, earth, water, and air, and fastened them together. However, they didn't use the indestructible bonds with which they themselves were held together, but joined the portions together with countless rivets,* too minute to see, and made each body a unified whole consisting of all four ingredients. Then they bound the revolutions of the immortal soul into the body with its ebbs and flows.

These revolutions neither dominated nor were dominated by the mighty flood within which they had been bound, but sometimes they were forced to fall in with its motion, and sometimes they forced it to do the same. The result was that the entire creature was in motion, but it was disorderly b
movement, chaotic and irrational progress involving all six kinds of motion. It travelled erratically in every one of the six directions—forward and back, right and left, down and up. For it was a mighty wave that washed over it and ebbed away from it, a mighty food-supplying wave, but even greater was the disturbance caused by the properties of things as they struck the body—as any given body met and collided c
with fire from outside and elsewhere, or with a solid mass of earth, or with liquid streams of water, or when it was overtaken by a gust of air-driven wind—and when the motions caused by all these things passed through the body and struck the soul. In fact, that is why these motions came collectively to be called by the name they still bear: 'sensations.'*

Moreover, just then, at the time we're speaking of, these motions produced their strongest and most powerful impulse. Their movement coincided with that of the ever-flowing current and vigorously shook the circuits of the soul. d
With their contrary flow opposing the circular movement of identity, they prevented it from getting going, and they also threw the revolution of difference into confusion. The upshot was that they twisted and distorted all three double and all three triple intervals, and the intervening means and bonds (3:2, 4:3, and 9:8)—which could not be completely unbound except by him who bound them together—and caused all kinds of disruption and corruption in the e
rings, wherever and however they could. As a consequence, the rings became only tenuously linked to each other, and although they remained in motion, their movements were irrational: they sometimes went in reverse, at other times from side to side, and at other times upside down.

Think, for instance, of a man who is upside down, with his head resting on the ground and his feet up in the air, supported against something: as long as these circumstances last, both he, the person in that position, and any spectators perceive his right as his left and his left as his right, and he sees their right and left the wrong way round too. Extreme versions of this, and other experiences of the same kind, are undergone by the revolutions, and whenever they encounter
44a from outside anything that belongs to the class either of identity or of difference, they call it the same as something or different from something, but get things completely the wrong way around and prove themselves to be deluded and stupid. At that time there is no sovereign circuit in them, no rulership, and so some of the sensations that sweep in from outside and strike the revolutions also draw the whole chamber for the soul along with them, and then, for all that the revolutions appear to be in control, they're actually being controlled. And these experiences are responsible for the fact that even today, as well as at the beginning, a soul lacks
b intelligence when it is first bound into a mortal body.

But eventually the stream of growth and nurture abates, and with the passage of time the circular motions regain tranquillity and return to their proper courses, and things increasingly return to normal.* From then on, as each of the rings regains its normal shape, their revolutions become less erratic, begin to identify difference and identity correctly, and make their possessor intelligent. Also, if proper nurture
c is supported by education, a person will become perfectly whole and healthy, once he has recovered from this most serious of illnesses; but if he cares nothing for education, he will limp his way through life and return to Hades unfulfilled and stupid.

But I've got ahead of myself. We do need to go into the matters before us in more detail, but first there are some preliminaries. We need to discuss the creation of human bodies, part by part; we need to discuss the soul; and we

need to discuss what the gods were thinking of and intending when they created the body and soul. Where these matters are concerned, we had better keep to the most plausible account d
and let it guide our steps.

In imitation of the rounded shape of the universe,* the gods bound the two divine circuits into a spherical body, which we now call the head. The head is the most divine part of us and the ruler of all the rest of our parts, and once they had assembled the body as a whole, they handed it over to the head, to be its servant, because they realized that the body's capacities included all the movements there were to be. In other words, not wanting the head to roll around on the ground without the ability to climb over the various rises e
and out of the various dips, they gave it the body to be its vehicle and means of transport.* This is why the body is elongated and why it sprouted four limbs which can be stretched and flexed; it was the gods' way of devising a form of transport. By using these limbs to hold on to things and to support itself, the body became capable of crossing every kind of terrain, while carrying our most divine and sacred 45a
part in its lofty home.

So that's why we have legs and arms attached to us. Now, the gods considered the front more valuable and more authoritative than the back, so they made forward the main direction in which we travel. It then became necessary for the front of a human being to have specific differences from the back, and so, taking first the head-box, they positioned the face there, fixed on the face organs to enable the soul to be b
fully aware,* and ordained that this part, our natural front, should be the leader.

The first of the organs they constructed were the light-bearing eyes, and the reason they attached the eyes to the face was as follows. They found a way to make a distinct stuff out of that portion of fire which has the ability to shed gentle light without burning, and to make it the property of each passing day. Then they made the pure fire within us, which is

naturally akin to this daylight, flow through the eyes,* and they compressed the whole of the eyes, but especially the central part, until they were smooth and dense, so that they
c would block everything that was more coarse and let only something with this kind of purity filter through. So whenever the ray that flows through the eyes issues forth into surrounding daylight, like meets with like and coalesces with it, until a single, undifferentiated stuff is formed, in alignment with the direction of the eyes, wherever the fire from inside strikes and pushes up against an external object. The similarity between the fire from within and the fire outside means that the stuff is completely homogeneous,
d and whenever it touches or is touched by anything else, it transmits the object's impulses right through itself and all the way up to the soul, and the result is the perception we call 'seeing'.

At nightfall, however, with the departure of its cognate fire, the visual ray is interrupted. It issues forth, but, encountering something dissimilar to itself, fades and dies out, since it can no longer attach itself to the fireless air adjacent to it. The upshot is that it not only stops seeing, but also encour-
e ages sleep. For the internal fire, which gets trapped inside by the closure of the eyelids (the gods' way of protecting the organ of sight), disperses and smooths out any internal impulses, and the result of this smoothness is a state of quiet. When the state of quiet is profound, the sleep that ensues is almost dreamless, but when some relatively large impulses remain trapped inside, they produce images whose nature and number depend on the nature and location of the move-
46a ments; and although these images are internal copies, when awake we recall them as events that occurred outside us.

It should now be easy to understand what happens in the formation of images by mirrors or any other reflective surface.* As a result of the interaction between the fire from inside and the fire from outside, and because a single, though much-distorted, substance is formed on each occasion by

the surface, things necessarily appear as they do. When the b
fire from your face coalesces with the fire from my organ of
sight on something that is smooth and bright, left appears to
be right, because the opposite parts of the visual ray make
contact with the opposite parts of your face, contrary to the
way they usually impact on each other. On the other hand,
right appears as right and left as left whenever light changes
sides as it coalesces with the other light, and this happens
when the mirror's surface is curved up on either side, so that c
the right side of the visual ray is deflected over to the left,
and vice versa. But when just such a mirror is turned until
it is vertical in relation to the face, it makes everything
appear upside down, since the bottom of the ray is deflected
to the top and the top to the bottom.

Now, all these factors count as contributory causes,* used
by the gods to serve their work of achieving the best possible
result. Most people, however, take them to be not contribu- d
tory causes, but the actual causes of everything, because of
the various effects they have, such as cooling things down
and heating them, or thickening and thinning them.* But
none of them can possibly possess rationality or intelligence.
We are bound to affirm that the only existing thing which
can properly possess intelligence is soul, and soul is invis-
ible, whereas fire, water, earth, and air are all visible sub-
stances. So anyone who desires understanding and knowledge
must look for his primary causes to that which is essentially
intelligent, and look for his secondary causes in the domain e
of things that are moved by other things and in their turn
move others by automatic necessity. We should do the same
as well: we should discuss both kinds of causes, but keep
those which fashion good and beautiful products with the
help of intelligent craftsmanship separate from those which
produce random and disorderly results, with no part played
by intelligence.

Anyway, I've said enough about the accessory causes that
enabled the eyes to gain the power they now possess, and I'd

better go on to explain why the gods endowed us with
47a eyes — what the eyes do that does us so much good. It follows from what I've been saying that sight is enormously beneficial for us, in the sense that, if we couldn't see the stars and the sun and the sky, an account such as I've been giving of the universe would be completely impossible. As things are, however, the visibility of day and night, of months and the circling years, of equinoxes and solstices, resulted in the invention of number, gave us the concept of time, and made it possible for us to enquire into the nature of the universe. These in
b their turn have enabled us to equip ourselves with philosophy in general, and humankind never has been nor ever will be granted by the gods a greater good than philosophy.

This is, in my opinion, the greatest benefit we gain from the eyes — and why should we celebrate all the lesser benefits, the loss of which would cause a non-philosopher who had lost his sight to wail and grieve in vain? Instead, let's simply state that the reason and purpose of this gift is as follows: the gods invented and supplied us with vision to enable us to observe the rational revolutions of the heavens* and to let them affect the revolutions of thought within ourselves (which are
c naturally akin to those in the heavens, though ours are turbulent while they are calm). That is, the gods wanted us to make a close study of the circular motions of the heavens, gain the ability to calculate them correctly in accordance with their nature, assimilate ours to the perfect evenness of the god's,* and so stabilize the wandering revolutions within us.

The same account goes for sound and hearing too:* they were given to us by the gods for the same purpose and the same reasons. Speech, for instance, was designed for exactly the same purpose, and in fact makes a major contribution to it; and then as much of the domain of the Muses as can be
d employed for the hearing of sound† was given for the sake of attunement. And attunement, whose movements are naturally akin to the circular motions of our souls, is useful to the man who makes intelligent use of the Muses not for

mindless pleasure (which is nowadays taken to be the point of melody), but for the disharmony of the soul's revolutions that has arisen in us: attunement is an ally, provided by the Muses for the soul in its fight to restore itself to order and harmony. Rhythm also was given for the same purpose by the same benefactors, to support us because for the most e
part our internal state is inconsistent and graceless.

Well, so far, apart from a brief digression,* my whole presentation has been concerned with the products of intelligent craftsmanship, but since the creation of this world of ours was the result of reason and necessity together, I should also serve up an account of the creations of necessity.* 48a
Reason prevailed over necessity by persuading it to steer the majority of created things towards perfection,* and this was how the universe was originally created, as a result of the defeat of necessity by the persuasive power of intelligence. Since this was the manner and means of the creation of the universe, then an account of how it actually came into existence has to include the wandering cause as well,* and how it is in its nature to cause movement and change. So we'd better retrace our steps, find a different starting-point this time, b
one that exactly suits these facts, and start again from the beginning, to take account of this, just as we did earlier with the facts before us then.

What we have to do is see what fire, water, air, and earth were like in themselves before the creation of the universe, and what happened to them then. No one before has ever explained how they were created.* People talk as if it were clear what fire and so on are and take them to be the principles and† letters, so to speak, of the universe, when in actual fact they shouldn't even be compared to syllables.* Only someone of slight intelligence is likely to make such a comparison. c
So let's take the following as our position: where all four are concerned, we should not talk of their 'origin' or their 'principles', or follow whatever conception of them is currently

popular, above all because it's hard for us to keep to our present explanation and at the same time to clarify such a conception.* You shouldn't expect me to speak in that way, and I'd find it impossible to persuade myself that it would be the right way for me to go about the major undertaking
d before us. Instead, I'll stick to what I originally said about the value of likely accounts, I'll start again from the beginning, and I'll try to come up with an account of them, individually and collectively, that is at least as plausible as what I said before, and is more thorough.† So, as we embark on this account, let's call on the saviour god on this occasion too to preserve us from odd and outlandish explanations and to guide us towards a conclusion based on likelihood. And then
e let's start again from the beginning.*

For this fresh start of ours, we need to take account of more than we did before. Earlier we distinguished two types of things, but now we have to disclose the existence of a third kind, different from the others. Our earlier discussion required no more than the two — the model, as we suggested, and the copy of the model, the first being intelligible and ever-
49a consistent, the second visible and subject to creation — and we didn't distinguish a third at the time, on the grounds that these two would be sufficient. But now the argument seems to demand that our account should try to clarify this difficult and obscure kind of thing.*

How, then, should we conceive of it? What is its nature — what capacity or capacities does it have? We wouldn't be at all far from the mark if we thought of it as the receptacle (or nurse, if you like) of all creation.* This is a true statement, but it doesn't tell us everything we need to know about it. That degree of clarity is difficult, however, and not least
b because achieving it necessarily requires the raising of a prior problem about fire and its companions. The point is that it's hard to say, with any degree of reliability and stability, that any of them is such that it should really be called 'water' rather than 'fire', or that any of them is such that it should

be called by any particular name rather than by all four names, one after another.* Given this difficulty, then, how can we plausibly say exactly what one of them is? What terms should we use to describe it, and what are we to say?

In the first place, we apparently see what we've just been calling 'water' solidifying and turning into stones and earth, and we also apparently see it decomposing and ex- c
panding, becoming wind and air. Ignited air appears to be fire and, conversely, contracted and extinguished fire seems to change back to air. Again, when air shrinks and thickens it appears to become cloud and mist, and when these are further compressed water flows from them, and water in turn gives rise to earth and stones.* In other words, it looks as though there's a cyclical process whereby they generate one another.

Since it seems, then, as though none of them ever retains d
its identity, how could one insist without qualms and without making a fool of oneself that any of them is 'this' rather than something else? It can't be done. By far the safest course is to treat them and speak about them as follows. Whenever we see something — fire, for instance — that is constantly changing, we should not label it 'this' fire, but 'something of this sort'.* Likewise, we should never say 'this' water, but 'something of this sort', and the same goes for everything else that we indicate by means of expressions such as 'that' e
and 'this', under the impression that we're designating some particular thing and that these things have the slightest stability. The point is that they run away rather than face expressions such as 'that' and 'this' and 'just so',† and every form of speech that makes them out to be stable entities.

We had better not speak of any of them like that. Instead, it would be safest to say 'something of this sort', an expression which can be used to describe each and every one of them, and is similarly applicable at every stage of the cyclical process. So, for example, we should refer to fire as 'something that is regularly of this sort',* and so on for everything that is subject

50a to creation. The only safe referent of the expressions 'this' and 'that' is that within which each created thing comes into existence and puts in an appearance, and from which it subsequently passes away,* but anything that is of such-and-such a quality — warm or white or any of the opposites, or any combination of opposites — should never have that terminology used of them.

I'd better go back over what I've been saying and try to make it even clearer. Imagine someone who moulds out of gold all the shapes there are, but never stops remoulding each form and changing it into another. If you point at one
b of the shapes and ask him what it is, by far the safest reply, so far as truth is concerned, is for him to say 'gold'; he should never say that it's 'a triangle' or any of the other shapes he's in the process of making, because that would imply that these shapes are what they are, when in fact they're changing even while they're being identified.* However, he'd be content if you were, after all, also prepared to accept, with some degree of assurance, the reply 'something of this sort'.

By the same argument, the *same* term should always be used in speaking of the receptacle of all material bodies, because it never is anything other than what it is: it only ever acts as the receptacle for everything, and it never comes to
c resemble in any way whatsoever any of the things that enter it. Its nature is to act as the stuff from which everything is moulded — to be modified and altered by the things that enter it, with the result that it *appears* different at different times.* And whatever enters it and leaves it is a copy of something that exists for ever, a copy formed in an indescribably wonderful fashion which we'll look into later.*

Anyway, for the time being we should think of there being
d three kinds: the created world, the receptacle of creation, and the source, in whose likeness the created world is born. And it would not be out of place to compare the receptacle to a mother, the source to a father, and what they create between them to a child. We should also bear in mind that in order

for there to exist, as a product of the moulding stuff, something that bears the whole multifarious range of visible qualities, the moulding stuff itself, in which the product is formed and originates, absolutely must lack all those characteristics which it is to receive from elsewhere, otherwise it could not perform its function. After all, if it were similar to any of the e
things that enter it, it would be no good at receiving and copying contrary or utterly different qualities when *they* enter it, because it would leave traces of its own appearance as well. That is why, if it is to be the receptacle of *all* kinds, it must be *altogether* characterless.* Think, for instance, of perfumery, where artisans do exactly the same, as the first stage of the manufacturing process: they make the liquids which are to receive the scents as odourless as possible. Or think of those whose work involves taking impressions of shapes in soft materials: they allow no shape at all to remain noticeable, and they begin their work only once they've made their base stuff as uniform and smooth as possible.

The same goes, then, for that which repeatedly has to 51a
accept, over its whole extent, all the copies of all intelligible† and eternally existing things: if it is to do this well, it should in itself be characterless. This explains, then, why in speaking of the mother and receptacle of every created thing, of all that is visible or otherwise perceptible, we shouldn't call it earth or air or fire or water, or any of their compounds or constituents. And so we won't go wrong if we think of it as an invisible, formless receptacle of everything, which is in some highly obscure fashion linked with the intelligible b
realm. It's almost incomprehensible,* but in so far as we can use what we've been saying to arrive at a conception of its nature with some degree of accuracy, the best we can do is say that fire is the impression we receive when some part of it has been ignited, and water is the impression we receive when some part has been moistened, and earth and air are the impressions we receive in so far as it is the receptacle for copies of earth and air.

But we need to apply rational thought to achieve more clarity about these matters, by asking the following questions. Is there such a thing as fire which is just itself?* And what about all the other things we constantly describe in the
c same way, as each being just itself? Or is this kind of reality found only in things that are visible or otherwise perceptible by the bodily senses, and is the perceptible world, then, all that exists? If so, our repeated assertion that there are intelligible versions of individual things is foolish, and turns out to be empty talk. Well, the issue is too important for me just to insist that we're right and leave it untried and untested, but at the same time I don't want to load a lengthy digres-
d sion onto an already long speech. It would be best by far, under the present circumstances, if we could make a major distinction obvious in a few words.

Speaking for myself, this is how I cast my vote: if knowledge and true belief are two distinct kinds of thing,* then these entities absolutely do exist in themselves, even though they are accessible only to our minds, not to our senses; but if, as some people think, true belief is no different from knowledge, then we must count all the things we perceive with our bodily senses as the most reliable things in existence.
e But we're bound to claim that knowledge and true belief are different, because they occur under different circumstances and are dissimilar. In the first place, the former is a result of instruction, the latter of persuasion; in the second place, the former is always accompanied by a true account, while the latter cannot explain itself at all; in the third place, the former is unmoved by persuasion, while the latter can be persuaded to change; and finally, we have to claim that the former is the property of the gods, but of scarcely any human beings, while the latter is something every man has.

52a This being so, we have to admit that there exists, first, the class of things which are unchanging, uncreated, and undying, which neither admit anything else into themselves from elsewhere nor enter anything else themselves, and which are

imperceptible by sight or any of the other senses. This class is the proper object of intellect. Then, second, there is the class of things that have the same names as the members of the first class and resemble them, but are perceptible, created, and in perpetual motion, since they come into existence in a particular place and subsequently pass away from there. This class is grasped by belief with the support of sensation. Then, third, there is space,* which exists for ever and is indestructible, and which acts as the arena for everything b that is subject to creation. It is grasped by a kind of bastard reasoning, without the support of sensation, and is hardly credible.* In fact, when we take space into consideration we come to suffer from dreamlike illusions, and to claim that every existing thing must surely exist in some particular place and must occupy some space, and that nothing exists except what exists on earth or in the heavens.

This dreaming keeps us asleep and makes it impossible for us to determine the truth about these and other related c matters; we find it impossible to speak the truth even about the realm of true being, where illusion plays no part. And the truth is this: since even the conditions of an image's occurrence lie outside the image itself—since it is an ever-moving apparition of something else—it *has* to occur in something other than itself (and so somehow or other to cling on to existence), or else it would be nothing at all; anything that genuinely exists, however, is supported by the true and rigorous argument that neither of two distinct entities can ever occur in the other, because that would make them simultan- d eously one and two. So there we have, briefly argued, the position that gets my vote: there were three distinct things in existence even before the universe was created—being, space, and creation.

As if it were not enough that the nurse of creation presents a complex appearance (as a result of being moistened and heated, of assuming the characters of earth and air, and of e acquiring all the qualities that follow from all this), it is also

thoroughly imbalanced (as a result of being filled with dissimilar and imbalanced powers), and not only is it shaken by the things it contains, so that it lurches haphazardly all over the place, but its motion in turn further shakes them. This stirring causes them to be constantly moving in different directions and to become separated. It's like when things are shaken and sifted by sieves or other devices for cleaning grain: the
53a heavy, dense material goes one way, while the light, flimsy material goes and settles elsewhere. Likewise, when these four were shaken at that time by the receptacle (which was itself in motion, like an implement for shaking stuff), the least similar among them ended up the furthest apart, and those that were most similar were pushed the closest together.*

This explains, of course, how they came to occupy different locations even before they had become the constituents of the orderly universe that came into existence. Not only were they disproportionate and erratic, however, before that
b event, but even when the organization of the universe was first taken in hand, fire, water, earth, and air, despite displaying certain hints of their true natures, were still wholly in the kind of state you'd expect anything to be with no god present.* Finding them in that condition, then, the first thing the god did, when he came to organize the universe, was use shapes and numbers to assign them definite forms;* and we can take for granted, as the principal axiom affirmed by us, that the god did not leave them in the condition he found them, but made them as beautiful and as perfect as they could possibly be.*

So what I have to do now is try to explain to you the com-
c position and origin of each of them. It will take an unusual argument, but you'll be able to follow it, because you're familiar with the intellectual disciplines I shall draw on in my account. The starting-point is, of course, universally accepted: that fire, earth, water, and air are material bodies. Now, this means that, like all bodies, they have depth, and anything with depth is necessarily surrounded by surfaces, and any rectilinear surface consists of triangles.* There are

two basic triangles from which all triangles are derived, and d
each of them has one right angle and two acute angles. On
one of the two basic triangles, the two acute angles are each
half of a right angle which has been divided by equal sides;*
on the other basic triangle, the two acute angles are unequal
portions of a right angle which has been divided into two
parts by unequal sides.* These, then, are the principles of
fire and the other bodies, or so we assume, since we are con-
tinuing to let likelihood, supported by logical necessity,
guide our account; if there are any principles more ultimate
than these, they are known only to the god and to men who
are dear to him.

We have to decide, then, which are the most beautiful e
bodies that can be created. There should be four of them,
and they must be dissimilar to one another, but capable (in
some cases) of arising out of one another's disintegration. If
we succeed at this task, we'll know the truth about the gen-
eration of earth, fire, and the bodies that act as proportionate
means between these two extremes. For we will never agree
with anyone who claims that there are or could be more
perfect visible bodies than these four,* each after its own
kind. So we should do our best to construct our four sub-
stances, each of outstanding beauty, and to reach a position
where we can claim to have adequately understood what
they are like.

Of our two triangles, the isosceles one is essentially single, 54a
whereas there's an infinite number of right-angled scalene
triangles. What we have to do, then, if we're to start prop-
erly, is select the most beautiful of this infinite plurality of
scalene triangles. If anyone can demonstrate that his choice
creates more beautiful structures, we'll welcome our defeat,
not resent it. But until then our position is that there is one
that is the most beautiful, and surpasses† all other scalene
triangles, and that is the one which is a constituent of the
equilateral triangle, with two triangles making the equilat-
eral one as a third. It would take rather a long time to explain

b why, but if anyone challenges our claim and finds that we were wrong,† we won't resent his victory. So these are our choices for the two triangles from which the bodies of fire and the rest were constructed — the isosceles, and the one whose essential property is that the square of the longer side is triple the square of the shorter side.*

I had better, just for a moment, clarify something that was not clearly expressed earlier. We were thinking that all four substances issued from one another and turned into one another, but this was wrong. Although there are indeed four
c substances that are produced by the triangles we've selected, three of them are assembled from the one that has unequal sides, while only the fourth is assembled from the isosceles triangle. It follows that they are not all capable of arising out of one another's disintegration, in the sense of forming a small number of large entities from a large number of small ones or vice versa. Only the three can do that,* since they are all made up of a single type of triangle, and so, when the larger bodies fall apart, a large number of small bodies, in their appropriate shapes, are formed from them, and conversely, when many small bodies are resolved into their con-
d stituent triangles, they might even, if they become numerically one, produce a single, large entity with a single mass.

That's all that needs to be said about the generation of the four substances from one another, but the next questions would be: what shape was each of them made with, and how many constituents combine to produce each of them? Let's start with the first and smallest composite figure and its factor, which is the triangle whose hypotenuse is twice as long as its minor side. If you join two such triangles at their hypotenuses and do this three times, so that all the hypot-
e enuses and the short sides converge at the centre, you get a single equilateral triangle made up of six triangles.* If you put four of these equilateral triangles together in such a way that they form a single solid angle at the point where three
55a plane angles meet, this solid angle is the angle that comes

straight after the most obtuse possible plane angle. Four of these solid angles form the first solid figure,* the one which divides the whole surface of a surrounding sphere into equal and similar zones. The second figure is made up of the same triangles, but this time they form a set of eight equilateral triangles and use four plane angles to make a single solid angle. Six of these solid angles complete the second body. The third figure is made up of 120 of the elementary triangles, made into a solid, and twelve solid angles, with five equilat- b
eral triangular planes contributing to each solid angle. It has twenty faces consisting of equilateral triangles.

Once it had generated these figures, one of our two elementary triangles was absolved of further responsibility. Next, however, the isosceles triangle set about generating the fourth body: it formed itself into sets of four triangles, had their four right angles meet at the centre, and so produced a single equal-sided rectangle. Six of these rectangles joined together made eight solid angles, each made up of c
three plane right angles fitting neatly together. The resulting construct had the shape of a cube,* with six faces consisting of equal-sided rectangular planes. There remained one further construct, the fifth; the god decorated it all over and used it for the whole.*

Now, suppose someone took all this into consideration and wondered whether it would be right to say that there is an infinite number of worlds, or a finite number. This wouldn't be an outrageous question to ask, but he would conclude that only a man of boundless ignorance of matters he should know d
about could think that there is a boundless plurality.* It would be more reasonable, however, for someone to linger over the question whether in actual fact there are, strictly speaking, one or five worlds.* Our view, based on likelihood, asserts that the world is a single god, but someone else might take different points into consideration and draw a different conclusion.

But we had better not engage with him at the moment. We should allocate the figures whose generation we've just

described to fire, earth, water, and air. Let's begin by assigning the cube to earth, because, of the four bodies, earth is the
e most inert — the hardest to move and the readiest to hold its shape — and this description must above all fit the figure with the most secure faces. To put it in terms of our fundamental triangles, the most secure face must be the one consisting of triangles with equal sides, because it is naturally more secure than a face consisting of triangles with unequal sides. Besides, of the plane figures constructed out of our two kinds of triangle, an equal-sided square necessarily offers more stability than an equal-sided triangle. So not only do the square's constituent triangles offer more stability than those of the equilateral triangle, but also as a whole a square is more stable than a triangle.*

56a In assigning this figure to earth, then, we are preserving the likelihood of our account — as also if we assign the most inert of the remaining figures to water, the most mobile to fire, and the figure that is intermediate in terms of mobility to air; the smallest to fire, the largest to water, and the one in between to air; and the most angular to fire, the second-most angular to air, and the least angular to water. Of them all, then, the one with the fewest faces is bound to be the
b most mobile, since it is altogether the sharpest and the most angular of the three figures; and it is also bound to be the lightest, since it consists of the smallest number of identical parts. Then the one that comes second is the one that comes second in all these respects, and the one that comes third is the one that comes third in all these respects.

So, on grounds of both logic and likelihood, we can assume and affirm that the solid which was created in the form of a pyramid is the element and seed of fire, and the one we generated second is the element and seed of air, and the third one is the element and seed of water. Now, we must of course think of all these elements as being so small
c that we cannot see any individual one, whichever of the four categories it belongs to; what we see are lumps made up of a

lot of them all at once.* And, as regards the correspondences that obtain for their sizes, their relative mobility, and all their other properties, we should appreciate that, whenever and wherever necessity allowed itself to submit to persuasion, the god always seized the opportunity to make them correspond precisely with one another and be perfectly compatible in all such respects.

On the basis of everything we've said up until now about the four substances, it's highly likely that the facts are as follows. When earth encounters fire and is broken up by its d
angularity, it will be swept away (just as it would also be if it were a mass of air or water, rather than fire, within which it underwent disintegration), until its particles meet up somewhere and recombine as earth — and only as earth, because earth's constituents cannot play a part in any other figure. On the other hand, when water is broken up into its parts by fire or air, there's the possibility that, when they come together again, the result might be one bit of fire and two bits of air; and the fragments of air produced by the disinte- e
gration of a single bit of air could become two bits of fire. Conversely, when a little fire is surrounded by a lot of air or water or even earth, its motion brings it into conflict with the movement of the surrounding matter, and if the fire loses the battle, it disintegrates, and two bits of fire combine to make one air-figure. And when air is overcome and broken up, two-and-a-half bits of air join together into a single complete water-figure.*

Let's make a fresh set of calculations here. When one of the other bodies is cut up by the sharpness of the angles and 57a
edges of surrounding fire, if it recombines as fire, the process of disintegration stops, because nothing that is homogeneous and self-identical can change or be changed at all by something that has the same constitution; but disintegration continues as long as the process of transformation pits something weaker against something stronger. Then again, when a few smaller bits, surrounded by a lot of larger bits, are being

b broken up and extinguished, the process of extinction stops if they're capable of recombining as the figure of the victorious body, so that fire turns into air, or air into water.* But if the smaller bits confront and resist the larger bits, or even any one of the other bodies,† the process of disintegration continues either until the smaller bits have been forced to withdraw, disintegration is complete, and they've taken refuge with a body to which they are naturally akin; or until the smaller bits have been defeated and have turned into a single body of the same kind as the victorious body, in which case they stay and live alongside the victorious body. In addition,
c while these processes are going on, all four substances are exchanging places. Most of each kind of substance was dispelled into its own region by the movement of the receptacle,* but any bits that are in the process of changing and taking on a different identity are moved by the shaking of the receptacle towards the region of the substance to which they are now assimilated.

So much for the origin of the primary bodies in their original, unalloyed state. But the fact that they come in a wide variety of types is attributable to the structure of each of the
d two elementary triangles: neither structure originally engendered a triangle of just a single size;* the triangles could be smaller or larger, and numerically as many as there are versions of all the four bodies. And so, of course, the variety of ways they can interact, either just with themselves or with one another, is infinite—and this is the variety that has to be observed by those of us who intend to rely on likelihood in our accounts of the way things are.

What about movement and rest? Either we agree on how they begin and what factors are involved, or our subsequent
e discussion is going to be faced with many obstacles. I've already addressed the issue to a certain extent, but I have to add that uniformity and motion are incompatible. After all, it's difficult, not to say impossible, for there to exist something to be moved if there's no mover for it, or for a mover to exist if

there's nothing to be moved. In the absence of a mover and a moved, there's no such thing as motion, and mover and moved cannot possibly be uniform with each other. It follows that we should always associate rest with uniformity and attribute motion to diversity. And diversity is due to inequality, the 58a
cause of which we've already discussed.*

We have not, however, explained why the four bodies haven't become completely separated from one another, in which case the changes of quality and place that occur as a result of their interactions would have ended. So we had better retrace our steps and address the issue now. Once the vault of the universe has gathered the four bodies together inside itself, it compresses everything and squeezes out every last bit of void,* because, being spherical, it is in its nature to want to be close to itself. This explains why fire b
permeates everything the most, then air (as the second most subtle body), and so on. For the larger the constituent parts of a body, the more gaps remain in its structure, and the smaller the constituent parts, the fewer the gaps, and so the reduction caused by the compression pushes the small bodies into the gaps within the large bodies.* The result is that, with small bodies next to large ones, the smaller ones cause the larger ones to expand, while the larger ones cause the smaller ones to contract, and so they all change place and move, upwards or downwards, towards their proper regions. For as each of them changes size, it also changes location. And c
so a state of uniformity is never achieved, and diversity, now and in the future, keeps these things in perpetual motion.

Next, we need to take note of their varieties. Fire comes in many forms: there's flame, for instance, and the non-burning emanation from flame that sheds light for the eyes, and the residue of fire that coals retain after the flames have been extinguished. The same goes for air, which in its purest d
form is called 'aether', and when it is particularly foul 'fog' and 'darkness'. There are other kinds of air too, nameless ones, that occur as a result of its triangles' differences in size.

As for the varieties of water, they fall initially into two groups: the liquid and the liquefiable. Liquid water has particles that are small but unequal, and so, because of this unevenness and the shape of its figure, not only is it mobile in itself, but it can easily be moved by something else.
e Liquefiable water, however, consists of large, uniform particles, which make it more stable than the liquid version, and heavy, since its uniformity concentrates it. But when fire enters it and begins to break it up, it loses its uniformity, and with that destroyed it admits more motion. Once it has become mobile, it spreads out over the ground thanks to the pressure of the adjacent air. Each of these processes has its own name: we call the reduction of its bulk 'melting', and the spreading out over the ground 'flowing'.

59a What about the opposite situation, when fire is being driven out of it? Given that the fire doesn't pass into a void, the air adjacent to it comes under pressure and then compresses the liquid mass, which is still mobile, into the places previously occupied by fire and so makes the liquid homogeneous. The compression of the liquid and its recovery of uniformity (since fire, the cause of its lack of uniformity, is in the process of leaving) return the liquid to its normal state. The release of the fire is called 'cooling', and the reduction that happens when the fire leaves we regard as 'solidification'.*

b To take a few of all the varieties of what we've called liquefiable water, there's one that is extremely dense (because it consists of the most subtle and uniform parts) and unique of its kind, and has been endowed with a shiny, yellow colour: this is our most highly prized possession, gold, the solidity of which is due to its having been filtered through rocks. And gold also has an offshoot, dark in colour and so dense that it is very hard: this is adamant. Then there's a kind which is gold-like in terms of its particles, except that its particles are not uniform; in terms of density it is more dense than gold (and it also contains a small proportion of
c fine earth, which makes it harder), but it is lighter because

there are large gaps in it. This is the structure of copper, a bright, solid kind of water. When its constituent earth and water* begin to age and to separate once more from each other, the earthy part appears by itself on the surface and is called 'verdigris'.

We wouldn't now find it at all complicated to work out the details of all the other similar varieties; all we'd have to do is keep our gaze fixed on plausibility. If someone needed a break from accounts of eternal things, and put them to one side in favour of the innocent pleasure of exploring likely accounts of created things, he would create within his life a d
source of modest, intellectual amusement. So, since we've just indulged in this diversion, we shall carry on with further likely accounts on the same topic.

All water of a light and liquid variety has an admixture of fire and air,† and is called 'liquid' because of its mobility and the way it rolls over the ground. It owes its softness to the fact that its faces are less stable than those of earth and so yield to pressure. But when fire and air are extracted from this kind of water and leave it on its own, the departure of these bodies makes it more uniform and concentrated, e
which is to say that it solidifies. Water that fully undergoes this process above the ground is called 'hail', while the same phenomenon on the ground is called 'ice'; water that undergoes less of this process and remains only semi-solidified above the ground is called 'snow', while the same phenomenon on the ground, with dew in the process of solidification, is called 'frost'.

Most varieties of mixtures that involve water are known collectively as 'saps' or 'juices', since they are filtered through 60a
soil-based plants. There are so many different ways in which they can form mixtures that many remain nameless, but there are four which are particularly conspicuous (they have fire in them) and so have been named. The first of these is wine, which heats body and soul together. The second kind is smooth and, because it expands the visual ray, it is bright

and shiny to look at, with an iridescent appearance: this class consists of the oils, such as pine resin, castor-oil, olive-oil of course, and everything else that has the same attributes. The
b third kind restores the constrictions in the mouth to their normal, loose-textured state,* and thanks to this action produces sweetness: the general term by which this kind is known is 'honey'. The fourth kind is caustic (that is, it attacks flesh) and frothy: it is different from all the other saps, and is called 'verjuice'.

Now for some varieties of earth. One kind is filtered through water and turns into a stony body, as follows. The interaction of earth and water wears out the water, which changes into air,
c and then the air tries to rush up to its proper region. But there is no void above the mixture, and so the new air pushes at the adjacent air.* This adjacent air is heavy, and so, when pushed, it spreads out over the mass of earth, and crushes and compresses it into the places that are being left empty by the rising of the new air. The earth, compressed by the air, forms stone, which is insoluble in water. Two varieties of stone are formed: the more beautiful kind* is made out of equal, uniform particles and is transparent, the less beautiful kind is the opposite.

Another kind of earth has been deprived of all moisture
d by brief contact with fire and therefore has a more brittle composition than stone. We have come to call this variety of earth 'pottery'. In another instance, some moisture is left behind, and the result is earth which, once it has cooled down, is liquefiable by fire, and this is the dark-coloured millstone.†*

Then there are the two kinds of earth that have similarly had all the water extracted from the mixture, but consist of fairly light portions of earth and are briny; they are semi-solid and can be dissolved again in water. One is soda, good for cleaning off oil and soil, and the other is the substance
e which interacts well with the sense-organ in the mouth — salt, proverbially† beloved of the gods.

The explanation for why some compounds of earth and water are the kinds of solids that are not soluble in water, but are liquefiable by fire, is somewhat as follows. Fire and air don't usually decompose lumps of earth, because fire and air have smaller particles than the gaps in the structure of earth; so, since they have plenty of room to move and don't have to use force, they leave the earth intact and undissolved. Water, however, causes earth to disintegrate and dissolve, because the particles of water are larger, and so they force an opening. 61a
But water dissolves earth only when no pressure was involved when the earth was put together, while nothing but fire dissolves earth that was put together under pressure, because then only fire can make its way into the structure of the earth. The same goes for water too: only fire causes the disintegration of water that has been reduced by extreme pressure, but both fire and air disperse water which was put together under less pressure — air by acting on the gaps and fire by acting also on the triangles. However, air that was put together under pressure cannot be broken apart except into its elements, and if no pressure was involved only fire can dissolve it.

To return to bodies which are compounds of earth and water: as long as the gaps in the earth, even if they are being b
forcibly compressed, are occupied by the compound's original water, any particles of water approaching from outside fail to gain entrance and leave it undissolved; all they can do is flow around the whole lump. However, when particles of fire penetrate the gaps in the water, fire acts on water† as water does on earth, and so it is only these particles of fire that cause the compound body to be dissolved and to melt. Among such compounds, those which contain less water than earth include all kinds of glass and every variety of liquefiable stone (to use that expression), and those which c
contain more water than earth include all wax-like solids and those whose structure makes them usable as incense.

This will have to do as a presentation of the complexities involved in how the four substances interact and change into

one another thanks to their shapes. I should next try to explain how they came to have their qualities. A first point to note is that I'll be talking throughout about things that are perceptible, but we haven't yet discussed the formation of flesh, or of the properties of flesh, or of the mortal part of the soul. In actual fact, it's impossible to give an adequate account of
d these things without also discussing sensible qualities, and vice versa, but it's also more or less impossible to do both simultaneously. We must first assume the existence of one or the other of them, and then later check our assumptions. And so let's take for granted certain facts about the body and the soul, so that next, now that we've dealt with the four bodies, we can discuss their qualities.

First, then, let's see what we mean when we call fire 'hot'. We should do so by paying attention to fire's ability to open
e up and cut into our bodies. Almost all of us identify the experience as sharp, but all the factors that make fire intense and keen enough to pierce whatever it encounters — the thinness of its edges, the sharpness of its angles, the smallness of its constituent parts, and the speed of its motion — need
62a to be taken into account. We need to bear in mind the kind of shape it has, which is more perfectly designed than any other for opening up and lacerating our bodies, and so gives us not only the experience of what we call 'heat', but also its name.*

The opposite experience is obvious, but I don't want my speech to be deficient in any way. For, of course, when the larger particles of moisture outside the body enter the body, they try to push out the smaller ones, but are incapable of occupying the places formerly occupied by the smaller particles. What they do, then, is compress the moisture within our bodies and solidify it, changing its state from
b one of diversity and movement to one of rest, induced by uniformity and concentration. But anything that is forcibly compressed naturally resists by pushing itself out in the opposite direction, and the name given to this resistance and

this vibration is 'shivering' or 'ague', while both the experience as a whole and the cause of it are called 'cold'.

Something is 'hard' if our flesh yields to it, and 'soft' if it yields to our flesh; the terms are relative in this way. In order for something to yield, it has to rest on a small base, but the figure that consists of square faces is especially resistant, c because it rests on a very secure base. The more something attains maximum concentration and density, the more rigid it is.

The best way to gain the clearest possible understanding of 'heavy' and 'light' is to consider the nature of 'down' and 'up' at the same time. For the idea that the universe is essentially divided up into two opposite regions—a lower one, defined as that towards which everything that has some physical bulk moves, and an upper one, defined as that towards which anything moves only if forced to do so—is altogether incorrect.* The universe is spherical, and so all its d extremities, being equally far from the centre, must equally be extremities; and the centre is the same distance away from the extremities, and so should really be regarded as directly opposite all of them. Since this is how the world is, which of the regions mentioned could one classify as 'up' or 'down' without exposing oneself to justified criticism for improper use of words? It's wrong to say that the central region is, in itself, either 'down' or 'up': it's just in the centre.* And the periphery is not of course the centre, but neither can parts of it be distinguished on the grounds that one of them has more of a relation to the centre than any of the parts directly opposite it.

How can one use the terminology of opposition for something that is entirely undifferentiated? How could anyone think that was right? After all, if there were some solid body 63a equally poised in the centre of the universe, it couldn't possibly drift off to any extremity, because there'd be nothing to differentiate one extremity from another. No, if a man were to journey all around its surface, he would often find himself

standing at his own antipodes and so he would call the same spot both 'down' and 'up'. The point is, to repeat what I said a moment ago, that the universe is spherical, and so it's impossible for an intelligent person to talk of one part of it as 'down' and another as 'up'.

But how did these terms arise? In which circumstances do they really apply — that is, as a result of which phenomena have we become accustomed to divide the entire universe in
b this way? In order to answer these questions, we need to make the following thought-experiment. Suppose the surface upon which a man was treading were that region of the universe which has been assigned principally to fire (which is to say, the region which contains the largest collection of the stuff towards which fire tends to move), and suppose he had the ability to remove portions of the fire, put them in scales, and weigh them. When he lifted the beam and drew the fire into the air (which would take force, because air is not fire),
c it's surely obvious that he would have to use less force for the lesser amount of fire than he would for the greater amount. For when a single effort is used to raise two things at once, the object that resists less is bound to follow the force more readily than the object that offers more resistance, and so the large amount is said to be 'heavy' and to tend 'downward', and the small object is said to be 'light' and to tend 'upward'.

This is exactly what we have to detect ourselves doing where we are now. When we stand on earth and weigh a couple of earthy things (sometimes even some earth itself), we draw them into the air, and this takes force, because air is not earth, and we're going against the natural tendency of earth. Both our objects try to rejoin their cognate earth, but
d the smaller follows the force we exert more readily and more quickly than the larger into the alien medium. And so we call the smaller one 'light', we describe the place we force them into as 'up', and we use 'heavy' and 'down' for the opposite property and place.*

It follows that these properties necessarily stand in different relations to each other, because of the opposition that obtains between the regions occupied by the majority of each of the four bodies. For when we compare what is 'light' in one region with what is 'light' in the opposite region, what is 'heavy' with what is 'heavy', and likewise for 'up' e
and 'down', we'll find them all in the process of becoming, or actually being, opposite to one another, and at an angle to one another, and utterly different from one another. But the one and only point to bear in mind about them all is this: it is its tendency towards its cognate mass that makes the object with the tendency 'heavy' and makes the region into which it is moving 'down', and the other set of terms is reserved for when things move in the other way. This will do as an explanation of these properties.

As for smoothness and roughness, however, I'm sure that anyone could understand what causes them and could explain them to someone else. Something is rough if it combines hardness with unnevenness, and something is smooth if it is uniform and dense. 64a

We've been discussing experiences in which any and every part of the body may be involved, and there's a very important matter that still remains to be explained, namely the feelings of pleasure and pain that such experiences entail — that is, all those experiences which involve not only perception, gained by means of bodily parts, but also accompanying pains and pleasures. Now, in the case of every property, whether or not it is perceived, if we are to understand its causes we need to remember the distinction we b
made earlier between mobility and inertness, because that will help us find answers for everything we intend to understand. For when any body that is naturally mobile is exposed to even a slight modification, its parts spread the change all around by passing it on to other parts, until they reach the intelligent part and inform it of the action of the modifying agent. Conversely, a stable body merely receives the change,

without creating any ripple effect; it doesn't move any of its
c neighbours, and so, with the various parts failing to transmit the effect to other parts, the original modification remains in them, without moving on to the creature as a whole, and leaves the body unaware of any modification. This is what happens with all the predominantly earthy parts we have in our bodies, such as bones and hair,* whereas the former case applies especially to the organs of sight and hearing, because they are characterized especially by the presence in them of fire and air.

So here is how we should conceive of pleasure and pain.
d Any modification that is unnatural (that is, forced) and sudden is painful, while any modification that restores our normal condition and is sudden is pleasant; and any modification that is gentle and gradual is imperceptible, but the opposite kind of modification is perceptible.

Unimpeded modifications, however, certainly cause sensation, but involve no pain or pleasure. This is what happens with sight, for instance, which I described earlier as a substance that becomes attached to ours in the daytime. For nothing that modifies sight, not even something sharp and caustic, causes pain, nor again, when it recovers its original
e state, is there any pleasure involved, despite the fact that its perception of whatever modifies it, of everything it meets and makes contact with, is as thorough and clear as it could be. And the reason for the lack of pleasure and pain in sight is that there's no force involved in its contraction and expansion. Any body whose constituent parts are larger, however, does not readily yield to the modifying agent, and so the impulse is transmitted throughout the body, and pleasure or pain occurs—pain when unnatural change is involved, pleas-
65a ure when its normal state is restored.

Any body that undergoes a gradual departure from its normal state, a gradual depletion, but an overwhelming and sudden replenishment, has no perception of the depletion but only of the replenishment, and therefore gives the most

intense pleasure to the mortal part of the soul, without any perception of pain. This is easy to see in the case of pleasant scents. On the other hand, any body that experiences a sudden modification, and regains its normal state only gradually and slowly, provides the mortal part of the soul with the completely opposite experience. This too can be readily observed, when the body is burnt and cut.* b

That will have to do as a description of those processes in which any and every part of the body may be involved, and as an account of what the agents of these processes are called. We must next turn to processes which happen in particular parts of us and try, if we can, to explain what they are and how they are caused by their agents. Now, our earlier discussion of c sapidity was incomplete, and we should first explain, as best we can, those processes which are specific to the tongue. It looks as though they too, along with most others, happen as a result of certain things contracting and expanding, but they also seem to depend, more than any other kind of sensory experience, on roughness and smoothness.

When particles of earth enter the mouth and encounter the moist, supple flesh in the region of the tiny veins which are the tongue's taste-samplers, so to speak, and run from d the tongue to the heart, the particles are dissolved. If in the process of dissolution they make the veins more compact and dry, then those particles that are quite rough taste astringent, and those that are less rough taste harsh. Some solutions, however, rinse the veins and scrub the whole tongue: those that do so to excess and even inflict enough damage to decompose a layer of the tongue (this is the action of soda, for instance) are called 'bitter', while those that are e weaker than soda and whose scrubbing action is less severe are called 'salty'; they lack the harshness of bitter things and produce quite an agreeable sensation.

On the other hand, when the particles combine with the warmth of the mouth and have the edge taken off their roughness by it, and then are made as fiery as the source of

the heat and in their turn heat it up, they become light enough to rise up towards the sense-organs in the head, and on the
66a way they cut into whatever they encounter. All the particles that do this are called 'spicy'.

And when these same particles† have been lightened by decomposition and enter the narrow veins, those of them that are proportionate both with the earthy particles lying inside the veins and with those that contain a portion of air stir them into random movement around one another. In their random movement the particles of earth and air are dislodged and change places, and thus they create pockets that are wrapped around the particles that are entering from
b outside. So when a pocket of moisture (earthy or pure, as the case may be) is wrapped around air, moist containers of air, hollow spherical bits of water, are created. Those that consist of pure moisture surround their contents as transparent 'bubbles', as they are called, while the agitation and rising of those that consist of earthy moisture are called 'effervescence' and 'fermentation'. And what causes all these processes is called 'acid'.

The opposite explanation is needed for the quality that
c has precisely the opposite description to the one just given for acidity. When the composition of the particles that enter, once they are within their liquid surroundings, approximates to the condition of the tongue, it smears a smooth surface over the rough bits, tightens up those bits which have become unnaturally diffuse and relaxes those which are unnaturally tight, and restores everything as much as possible to its normal state. Everyone finds such a remedy for abnormal tightness and looseness pleasant and enjoyable, and it is called 'sweet'.

d That's enough on that topic, and now for the nostrils and what they do. There are no specific figures involved, because every scent is a 'half-breed': no single figure, as it turns out, has the proportions that would give it a scent. Our scent-veins are too narrow for earth and water, and too broad for fire

and air,* which means that no one has ever smelled any of them. Scents occur when things are damp or decomposing or dissolving or giving off smoke or vapour. That is, they occur in an intermediate stage, when water is changing into e
air, and air into water, and all scents are vapour or mist—mist being what effects the transition from air to water and vapour the transition from water to air. It follows that all scents are more subtle than water and more gross than air. The best opportunity for understanding scents is when your nose is blocked and you have to make an effort to breathe in. On such occasions, no scent filters through; the breath is drawn in by itself, without any scent. And so† all the various 67a
scents are nameless, because there aren't a specific number of types of scent nor are they straightforward. But let's here draw the only obvious distinction there is, between pleasant and unpleasant scents, and let's say that unpleasant scents roughen and assault the whole of the trunk between the head and the navel, and that pleasant scents mollify the trunk and restore it, with a feeling of contentment, to its normal state.

The third part of us that is involved in sense-perception is the organ of hearing, and we must next investigate and b
explain its experiences. Broadly speaking, let's take sound to be a blow delivered by air, through the ear, on the brain and the blood, and transmitted to the soul; and let's say that hearing is the movement, beginning at the head and ending in the region of the liver, caused by the impulse. When this movement is rapid the pitch of the sound is high, and the slower the movement the lower the pitch; a steady movement produces a uniform, smooth sound, and the opposite kind of movement produces a harsh sound; and loud or soft sounds are produced respectively by great and small move- c
ments.* As for harmonious sounds, we must leave them for a later stage of the discussion.*

The fourth and final* kind of perception contains so many varieties that we must divide it up. We call them all 'colours',

and each of them is a flame that flows from individual bodies and whose particles, being compatible with the organ of sight, produce vision. I've already explained how sight occurs,* but
d no more than that, and so now it makes excellent sense for us to cover colours. The following account would seem to be reasonable. The particles that travel from external objects and encounter the visual ray are of various sizes — some smaller, some larger, and some the same size as the particles of the visual ray itself. Those that are the same size are imperceptible — in fact, they are precisely those things that we call 'transparent'. Those that are larger contract the visual ray, while the smaller ones expand it, and so these larger and smaller particles are close kin to the hot and cold par-
e ticles that act on flesh, and to the astringent particles and also those heating ones we called 'spicy' that act on the tongue. The particles we call 'black' and 'white', then, are the same as those qualities, but in a different category, and they appear different from each other for the reasons given. And so we should use the names accordingly: 'white' is what expands the visual ray, and 'black' is the opposite.*

When a different kind of fire, with a faster movement, strikes the visual ray and expands it all the way up to the eyes,
68a it forces apart and decomposes the actual openings in the eyes, and expresses from them a flood of mixed fire and water, which we call 'weeping'. Since this fast-moving force is itself fire, when it meets fire from the opposite direction — the one leaping out from the eyes like a flash of lightning, and the other forcing its way in and being extinguished in the moisture — the ensuing turmoil creates all sorts of colours, and we call the experience 'dazzling', and what causes it 'bright' and 'shiny'.*

b There is also a kind of fire which is intermediate between these last two. It reaches the moisture of the eyes and blends with it, but it doesn't dazzle; and to the gleam of the fire through the moisture with which it is mixed, which produces the colour of blood, we give the name 'red'. When bright is

mixed with red and white, the result is orange-yellow,* but it would be foolish to try to state the precise proportions of the mixture, even if they were knowable, because one couldn't, with any degree of plausibility, come up with either a proof or a likely account of them.

Red mixed with black and white makes magenta, and violet is the result when this mixture is further burnt and more black is mixed in. The mixture of orange-yellow and grey produces yellow ochre, while grey is a blend of black and white. Yellow comes from the mixture of white and orange-yellow. The combination of bright and white, steeped in deep black, produces dark blue; dark blue mixed with white makes light blue; and yellow ochre blended with black makes green. c

As for the rest, it should be more or less clear from these examples what mixtures we must say they are equivalent to, if we're to preserve our likely story. But if one were to investigate these matters by actually putting them to the test, he would be displaying ignorance of the difference between human beings and gods. It is a divine matter to possess sufficient knowledge, and at the same time sufficient competence, to mix a plurality into a oneness, and conversely to break a oneness up into a plurality; there is not now nor will there ever be any human being who is up to either of these tasks. d

All this was the effect of necessity on our four substances, and this was the condition in which the craftsman-god, who made all that is perfect and best in this world of becoming, found them, at the time when he turned to fathering the self-sufficient, perfect god.* To serve him in his work, he made use of causes and their necessary effects, but he took personal responsibility for fashioning the goodness in all created things. And that is why we should distinguish two kinds of cause, the necessary and the divine, and should search in everything for the divine cause, if we are to attain as blessed a life as our nature permits. But our concern with e 69a

divine causes should lead us not to ignore necessary causes either, because it is impossible to discern the divine causes that interest us on their own, apart from necessary ones,* or to understand them, or in fact to have anything to do with them.

Now that the two kinds of cause, sifted and sorted like a builder's timbers, lie ready for our use, as the materials from which we're to stitch together the rest of our account,* let's go back to the beginning for a moment and swiftly make our way up to the point from where we embarked on the journey that brought us here. Let's try at last to bring our story to a
b close and to round it off in a way that fits in with what we've already said.

To repeat, then, one of my original assertions, the god found the four bodies we've been talking about in a chaotic state and made each of them compatible with itself and with the others, in as many ways and respects as they could be proportionate and compatible.* For at that time none of them had its characteristics, except by chance,* and in fact none of them had the slightest right to be called by the names that are now used of it and the others — 'fire', 'water',
c and so on. So he first imposed order on them all, and then he created this universe of ours out of them, as a single living being containing within itself all living beings, both mortal and immortal. He himself was the craftsman and creator of the divine beings, and he gave his own offspring the job of creating mortal beings. In imitation of their father, once they had received from him the immortal seed of soul, they proceeded to fashion a mortal body in which to enclose it, and to assign the whole body to be its vehicle.

They also housed within the body another type of soul, a mortal kind, which is liable to terrible, but inevitable, ex-
d periences. Chief among these is pleasure, evil's most potent lure;* then pain, fugitive from good; and then those mindless advisers confidence and fear, and obdurate passion, and gullible hope. Into the mix they added unreasoning sensation

and ever-adventurous desire, and so, constrained by necessity,* they constructed the mortal soul. Piety kept them from polluting the divine soul with these things, short of the direst emergency, and so they lodged the mortal soul in separate quarters, elsewhere in the body; and they built an e
isthmus to distinguish the region of the head from that of the chest, by placing the neck between them, to keep them apart. So they bound the mortal soul within the chest — the thorax, as it is called.

Since there are better and worse parts of the mortal soul, they also created a partition within the thoracic chamber (much as the women's quarters are separated from the 70a
men's quarters in a house) by setting the diaphragm as a barrier between them.* They housed the competitive part of the soul, the part that is characterized by courage and passion, closer to the head, between the diaphragm and the neck, so that it would be within hearing of reason and would share with it the task of forcibly restraining the appetitive part whenever it completely refused to obey the dictates of reason issuing from the acropolis,* unless forced to do so. So they established the heart there in the guardhouse. The reason they did so is that the heart is the node of the veins and b
the source of the blood that circulates vigorously throughout the body.* So suppose reason reports that the body is being injured by something from outside, or possibly even by an internal appetite: on receiving the message, passion flares up and transmits its inducements and threats through all the body's alleyways, so that every sentient part of the body becomes aware of them. And then all the parts become perfectly submissive and obedient, and so allow the best part to be the ruler in their midst.

Now, when frightening events are anticipated and when c
passion is being stirred, the heart leaps, but the gods knew in advance that it was fire that was going to be responsible whenever any part of the body that is subject to passion swells like this, and so, as a remedy, they had implanted the

lung in the body. For the lung is not only soft and bloodless, but it also has pores drilled inside it, like a sponge, and so, as the recipient of breath and drink, it cools the heart down
d and provides relief and comfort from the heat.* This is why they bored the windpipe through to the lung, and why they wrapped the lung around the heart like a kind of cushion, so that when passion is most active there, the heart has something soft and cooling to leap against. For the calmer the heart is, the more it can join passion in serving reason.

They lodged the appetitive part of the soul—the part that wants food, drink, and everything the nature of the
e body makes it feel it lacks—between the diaphragm and its boundary at the navel, building in this general area a kind of trough for the nourishment of the body. They tethered it there as if it were a wild animal, but one they were bound to look after, once it had been attached, if human beings were ever to exist. And the reason they stationed it there was to ensure that it was kept so busy feeding at the trough, and
71a lived so far away from the deliberating part, that it would raise as little disturbance and din as possible, and so would allow the sovereign part to deliberate in peace about what was best for them all, collectively and individually.*

The gods knew that this part of the soul would never understand reason, and they knew that even if it did somehow have some dim awareness of any of them, it was not in its nature to pay attention to anything reasoned they said. They knew that it would much more readily be bewitched by images and phantasms,* whether they appeared at night or in the daytime. But the gods had planned for exactly this eventuality, and had
b formed the liver and put it in the place where this part of the soul lived. They made the liver dense, smooth, bright, and sweet (but with some bitterness), so that it could act as a mirror for thoughts stemming from intellect, just as a mirror receives impressions and gives back images to look at.*

And so these thoughts can frighten this part of the soul, when they come down hard on it and threaten it, by exploiting

something of the liver's innate bitterness. By rapidly suffusing the entire surface of the liver with gall, the image they cast on it is one of bilious colours; they make the liver all compressed, wrinkled, and uneven, and induce pain and c
nausea by warping and shrinking a lobe, or by blocking up and closing cavities and portals. Alternatively, when some breath of mildness wafts down from the thoughts and paints the opposite kind of images on the surface of the liver, they afford a respite from bitterness by refusing to stir up or involve themselves with something alien to them. Instead, by exploiting the sweetness inherent throughout the liver for their own purposes,† they straighten all its parts until they are free of distortions, wrinkles, and blockages, and d
they make the part of the soul that has been housed in the same part of the body as the liver gracious and cheerful, so that at night it can indulge in the modest entertainment of divination by dreams, which it has to rely on since it lacks the ability to reason and to apply intelligence. For the gods who created us bore in mind that their father had ordered them to make the human race as good as possible, and so they organized even our base part so that it might have some kind of contact with truth,* and established the seat of div- e
ination in it.

There's good evidence that divination was a gift from the gods to compensate for human stupidity. For true, inspired divination is out of the question for anyone who has his wits about him; sleep or illness has to have fettered and weakened his intellect, or he has to be possessed, in an altered state of consciousness. However, he needs to be in command of his intelligence not only to recall and reflect upon the messages conveyed to him by divination or possession, whether he was asleep or awake at the time, but also to subject to rational analysis all the visions that appear to him, and to decide in 72a
what sense and for whom they signify some future, past, or present trouble or benefit.* But it's not the job of someone who has been out of his mind and remains so to assess by

himself the visions and the voices; no, it's an old, true saying that only a man of sound mind possesses the ability to do what pertains to himself, and to know himself.* That's why
b it's usual for interpreters to be appointed to assess the omens of those who are possessed. These interpreters are occasionally called 'diviners', but that just displays utter ignorance of the fact that they're really translators of riddling sayings and seeings, and should properly be thought of not as diviners, but as interpreters of omens.

Divination, then, is the reason why the liver is as it is and where it is — the location we mentioned. It should also be said that while a creature is still alive the signs to be found on its liver are fairly clear, but once the creature has been deprived of life the liver becomes opaque and its omens too
c faint to give any clear indications of meaning.* Moreover, the internal organ which lies just to the left of the liver was designed to serve it and was put there to do so: like a cloth which is kept beside a mirror so as to be always available and ready, it keeps the liver always bright and clean. Whenever the surface of the liver gains some impurities, as a result of physical ill-health, the spleen with its porousness — its pitted and bloodless fabric — cleans them all up.* Hence, as it
d absorbs the matter it has cleaned off the liver, it swells up and festers; but then, once the body has been purged, the swelling goes down and it reduces back to its normal size.

So much for the extent of the mortal and immortal parts of the soul, and where, in what company, and why they were given separate residences. Is our account true? We could be certain if and only if it met with the gods' endorsement. But that it is at least likely I think we can safely affirm, not only now, but even after we've examined the issues further. So let it stand.

e The same principle should guide us as we set about the next topic, which was the formation of the rest of the body.* It would be best to attribute its construction to some such reasoning as follows. The gods who formed the human race

knew that we would lack self-control over food and drink, that our greed would make us consume far more of them than was either moderate or necessary. They wanted to ensure that the human species was not rapidly killed off by diseases and did not come to an end straight away, without having attained 73a
its proper end. As a result of this prescience, then, they put the so-called 'abdomen' in place as a receptacle to hold excess food and drink, and they looped the intestines to and fro to stop food passing so quickly through us that before very long the body would necessarily need more, and so generate a cycle of insatiability. For gluttony would prevent any of us from being interested in philosophy and culture, as a result of being incapable of attending to the most divine part of us.

As for bones, flesh, and everything of that sort, this is b
what happened. All of them depend for their existence on the formation of the marrow, because as long as the soul is bound to the body, the bonds of life, the roots of humankind, are set fast in the marrow.* The marrow itself was created out of different constituents. What the god did was set to one side, away from all others of their kinds, those of the primary triangles which were rectilinear and smooth enough to be capable of producing perfectly precise versions of fire, water, air, and earth, which he then blended together in due proportion to come up with a seed-bank for the entire c
human race — which is to say that he used them as the constituents of the marrow. And then he planted the different kinds of soul firmly in the marrow.

He set about dividing the marrow into the same number and variety of shapes as the number and particular varieties of soul that it was going to hold. (This was actually the very first stage of the process of assigning parts of the soul to different locations.) That is, he formed into a perfect sphere the field, so to speak, that was to be sown with the divine kind of seed, and he called this portion of the marrow the 'brain', because in a complete creature the container for this d

portion of marrow would be the 'head'.* But the portion of the marrow that was to confine the remaining kind of soul, the mortal kind, he divided into cylindrical shapes, to all of which he gave the name 'marrow'. He used this cylindrical marrow, like an anchor, as a foundation for the bonds of the whole soul, and finally he set about making the human body to surround this marrow, with the first of his constructions being a protective covering for it, made out of bone.*

e This was his recipe for bone. He sieved all the impurities and roughness out of earth, kneaded and moistened it with marrow, put the mixture into fire, and dipped it in water. He then put it back into fire and then into water again, and did this swapping from one to the other often enough for it to become indissoluble by both of them. Drawing on this mixture, he fashioned from it a sphere in which to enclose
74a the brain, but left a narrow opening; and then he used more of the mixture to make the vertebrae to enclose the marrow for the neck and the back, and lined the vertebrae up one under another, like hinges,* starting at the head and continuing through the entire trunk. And so he kept the full quota of seed penned safe inside a stony enclosure, into which he introduced joints, using in their case the quality of difference that had been inserted between them, like a mean, to ensure movement and flexibility.

b Bone, however, was still too brittle and inflexible for the god's liking, and he also thought that it wouldn't take long for exposure to extreme heat and then subsequent cold to mortify the bone and so destroy the seed inside. So he created ligaments and flesh. He used the ligaments to link all the limbs, and to allow the body to bend and straighten around its pivots as the ligaments tightened and relaxed. And he made flesh as a defence against the burning heat of summer and a shield against winter's cold, and also to protect the
c body against accidents by softly and gently yielding to solid matter, much as felted materials do. He also made it contain warm moisture, so that in the heat of summer the moisture

of its sweat† would enable it to cool the whole surface of the body from its own resources, and conversely, in winter, it would have this fire within itself to provide at least some defence against the assault and encroachment of the freezing cold from outside.

With these plans in mind, the god who shaped us mixed water, fire, and earth well together, stirred in a leaven of acidity and salt, and so made flesh, sappy and soft. And he made d
ligaments from a blend of bone and unleavened flesh, which produced a single substance intermediate between the two of them, to which he applied an orange-yellow colour. This is why ligaments have a more rigid and cohesive texture than flesh, and are softer and moister than bones. The god wrapped these ligaments around the bones with their marrow, and used them to join the bones to one another; and then over the whole frame he draped the canopy of flesh.

He used very little flesh, however, to enclose those bones e
that have the most soul, while he used a lot of especially thick flesh for those that contain very little soul. He even made a little flesh for the points where bones make contact with one another, where there was no rational requirement for there to be any; but he didn't want the joints to seize up and make bodies too stiff for ease of movement. He also didn't want sensitivity to be impeded and the mind made less retentive and more obtuse in intellectual matters by thick layers of flesh packed densely together. So that is why all the parts of the body that lack joints (such as the thighs, lower legs, and 75a
waist, and the bones of the upper arms and forearms)—that is, all the bones that have so little soul within their marrow that they lack intelligence—were well supplied with flesh. And the reason why all the intelligent parts have less flesh is invariably as stated—with the exception, of course, of any fleshy part that was made just as an organ of sense, such as the tongue. For any part whose creation and development are governed by necessity cannot possibly have dense bone and a b
lot of flesh at the same time as acute sensitivity.

After all, if these two properties were prepared to coincide in a single structure, the head would have been the prime candidate for possessing them, and human beings, with heads on their shoulders strengthened by flesh and ligaments, would live twice as long, or even more, and would have gained healthier and less painful lives than now. But as things are, the craftsmen-gods who made us weighed up whether they should create a worse but longer-lived race,
c or a better one that didn't live as long, and decided that the shorter life was in every conceivable respect better than the longer one. And so they covered the top of our head with just a thin layer of bone, though not with flesh (or ligaments, because it doesn't have joints). For all these reasons, then, every man's head is more vulnerable than the body to which it is attached, but more sensitive and intelligent.* And this
d was also why the god provided only the edge of the head with ligaments — the ones he wound around the neck and, with the help of the principle of identity, glued in place. He joined the ends of the jaw-bones to these ligaments behind the face, and he distributed the rest of the ligaments here and there throughout the body, connecting joint to joint.

The gods responsible for such things equipped the mouth with its orderly array of teeth, tongue, and lips, and gave them their present arrangement, because this was both necessary and in our best interests. They were guided by necessity in
e making the mouth an entrance, but by what is best for us in making it an exit. For everything that enters the body as nourishment is necessary, while no stream could be more beautiful or better than the stream of words that flows out of us in the service of intelligence.

The seasonal excesses of either heat or cold meant that they couldn't allow the head to be nothing but bare bone, but at the same time they couldn't let it be so screened by a mass of flesh that it became obtuse and insensitive. So a superfluous
76a piece of crust — or 'skin', as we now call it — was removed from the body's flesh, and, thanks to the moisture of the brain,

shrank and spread until it clothed the entire circumference of the head. The moisture seeped up through the sutures, watered it, and sealed it at the crown of the head, as if it were tying a knot. And the fact that there are various kinds of suture is due to the circular motions and to food: the more these two forces conflict with each other, the more sutures there are, and the less they do so, the fewer the sutures.

The divine part of the soul now set about pricking the skin b
of the head with fire all over and on every side, until the skin had been punctured enough for the moisture to begin to pass outside through it. All that was purely wet and purely warm left, while that which was a compound, of the same constituents as the skin, was pulled up by the motion and elongated outside, each bit of it being just as fine as its puncture-hole. This took so long, however, that the surrounding air outside had time to push it back inside again under the skin, where it curled around and took root. These were the c
processes, then, that provided the skin with hair. Hair is a wiry form of the same ingredients as the skin, though harder and denser, because it became compressed as it cooled down. (It was during the process of detachment from the skin that each hair cooled down and became compressed.) So this was how the creator god matted our heads with hair: hair was the result of the processes I've mentioned, and in making use of them the god's thinking was that this, rather than flesh, was the appropriate covering to protect the brain's chamber, since it was light, provided adequate shelter and protection d
in all seasons, and didn't impede and obstruct the brain's sensitivity at all.

Then there's the mixture formed at the fingers by the intertwining of ligament, skin, and bone, a single compound made up of all three of them, which dries to become hard skin. These three were the contributory causes of its formation, but responsibility for its creation really lay with the ability to think about the future.* For our creators were aware that among the future incarnations of men would be not just women, but all e

the various animal species, and they knew that many of these creatures would need nails for many practical purposes, and so they created rudimentary nails as soon as human beings came into existence. So much for the reasoning and thinking that led the gods to cause skin, hair, and nails to grow at the extremities of the body.

Once the mortal creature had been equipped with its full
77a complement of parts and limbs … well, its circumstances were such that it necessarily spent its time exposed to fire and air, and they were melting and eroding it away. The gods therefore came up with a scheme to help it. They engendered a compound with a constitution that was naturally akin to the human constitution, but which was so different in appearance and awareness that it was in fact a different living being. These living beings are now cultivated trees, plants, and seeds, which have been reclaimed by agriculture for our use from their original wild state, before they were ever cultivated.

b I call them 'living beings' because there can be nothing wrong or incorrect in calling everything that is characterized by life a 'living being', but the kind of living being that we're talking about at the moment possesses only the third kind of soul, the one we located between the diaphragm and the navel. This kind of soul knows nothing of belief, reasoning, and intelligence, but is aware only of the pleasures and pains that accompany its appetites. Passivity is its constant and only mode of existence; it was not created with the gift of a natural capacity for self-consciousness or for rational thought about any aspect of itself (which are properties only of that
c which spins within itself and around its own centre, repelling external impulses while drawing on its own power of movement). And so, although it is certainly alive and counts as a living being, it is fixed and rooted in one place, without the ability to move itself.*

Once the gods, who are as superior to us as we are inferior to them, had engendered all these species to nourish us, they bored pipes through the human body, like those irrigation

channels you find in orchards, so that the body might be watered, so to speak, by onrushing streams. The body's channels, however, were hidden under the junction of skin and d
flesh. They first cut two veins for the back, which, since the left and right sides of the body match, they ran down either side of the spine, with the life-giving marrow between them to ensure that it flourished. Thanks to its downhill course, the downpour could flow easily enough to pass from there evenly through its channels to all the other parts of the body.* They next split these veins at the head, plaited them together, and e
sent them over to opposite sides, crossing the veins from the right side of the body to the left, and those from the left to the right, to help the skin join the head to the body (given that there were no ligaments surrounding the head at its crown and holding it in place), and at the same time to make sure that the whole body might be fully aware of sense-impressions from both sides.

After that, they constructed the irrigation system. We'll find it easier to see how it works if we can first agree that 78a
everything that consists of smaller particles is impermeable by larger particles, while anything that is made up of larger particles is permeable by smaller particles.* This explains why fire, which has the smallest constituent parts, cannot be blocked by anything; it passes through water, earth, air, and anything that consists of them. The same principle will help us to understand what goes on with our abdomens. When food and drink fall into the abdomen, it keeps them in, but it can't keep in fire and the air we breathe, because b
they consist of smaller particles than the particles of the abdomen itself. And so, for channelling stuff from the abdomen to the veins, the god made use of air and fire, which he wove into an object that looked rather like a fish-trap.* It had a pair of tubes at the entrance, for one of which he wove a further fork; and from the tubes he ran cords, so to speak, which coiled throughout the whole structure from one end to the other. All these inner parts of the 'basket' he c

made out of fire, while the tubes and the container were made from air.

He then took this artefact and wrapped it around the living being he had formed, somewhat as follows. He inserted the tube system by way of the mouth, letting one of the two tubes fall down the windpipe and into the lung, while the other descended alongside the windpipe into the abdomen.* It was the one that went into the lung that he split, and he sent a branch each in tandem along the channels of the nose, so that if the other tube, the one at the mouth, ever failed to function, this one would replenish all its streams too, as well as its own.

d He enveloped the entire trunk of the human body within the main container, and he initiated an alternating sequence whereby the whole thing first flowed gently together and into the tubes (gently, because the tubes are made from air) and back out of the tubes again; and at the same time the artefact sank inside through the body (which was possible because of the body's open texture) and then out again. Since rays of fire were bound fast inside the container, they
e followed the motion of the air in either direction. This process never ends as long as the mortal creature subsists and is, of course, the one the inventor of names called 'breathing in and out'.

The sole reason for the creation of the artefact, the sole purpose of this whole process, is so that the human body may be nourished and stay alive, by being watered and refreshed. For as the air goes in and out, it is accompanied by the fire inside it, which is attached to it. The fire surges to and fro and enters the body by means of the abdomen, where it finds
79a food and drink. It decomposes them, of course, and breaks them down into small pieces, which it then conducts through the channels on its route. Just as water flows from spring to irrigation channels, so fire draws the pieces to the veins and creates streams that flow through the veins as if the body were a conduit.

Let's take another look at the process of breathing, to see how it has come to be as it is now. Given that there's no void to be entered by any of the moving bodies, it obviously follows b that, when our breath moves outside and away from us, it doesn't enter a void, but pushes whatever is adjacent to it out of its place. Each body that is pushed in this way dislodges its neighbour, and so on, until, as a result of this automatic process, they are all necessarily driven around, following the breath, to the place originally occupied by the breath before it left, which they enter and fill up again. This all takes place c instantaneously, as when a wheel goes around, because there's no void. So the chest and the lung no sooner expel some air than they are refilled by the air around the body, which is being driven around and sinks inside through our porous flesh.* And conversely, when the air goes the other way and leaves through the body, it propels the breath around and in through the openings at the mouth and nostrils.

We should assume that the whole process first started as follows. In every living being, the hottest internal parts are d those that are close to the blood and the veins; it's as if we have our own innate fire-spring. In fact, this is the thing that, in our image of the fish-trap, we said was woven out of fire and ran through the inside of the 'basket' (while all the outside parts were made of air). Now, it's indisputable that what is hot naturally tries to join up with the matter to which it is naturally akin, and so it tends out of the body towards its own region. There are two passages through which it can leave, either via the body or via the mouth and the nostrils, and e whenever it rushes towards one of these openings, it propels air around towards the other. The air that was subject to this propelling-around is heated by its exposure to the internal fire, and cools down once it is outside the body. Given this change in temperature, and the fact that bits of air are now being heated at one or other of the openings, the heated stuff becomes more inclined to return by the route it came in by, since it tends towards what it is naturally akin to, and so it

propels whatever is at the other of the two openings around towards the first one. By constantly receiving and returning the same impulse, then, air creates a cyclical churning back and forth, and the result is breathing in and out.

This is also where we need to look if we're to explain cer-
80a tain other phenomena too, such as the cupping-glasses that doctors use,* and swallowing, and the way things that are thrown keep moving after their release through the air or on the ground. Then there are also all those sounds we hear as high or low in pitch because their speed is fast or slow. Sometimes their motion makes them sound discordant because of the unevenness of the movement they generate in us. At other times, however, they sound sweet because of the uni-
b formity of the movement in us: slower sounds catch up with the movements generated by faster sounds that had gone before, just as the impulses are dying away and have reached a speed similar to that which the new arrivals impart; this means that, when they catch up, the slower sounds don't throw the movements into turmoil with the new impulse they impose on them, but initiate an extra, slower motion, which fits in with the motion of the faster one which is coming to an end, and so create a single experience which is a blend of high and low pitch.* This, a source of mere pleasure to the mindless, delights the intelligent as a representation of divine harmony in mortal movements.

Then there are also all the different ways that water flows,
c and the descent of a thunderbolt, and the amazing way that amber and magnetite 'attract' things. In reality, as anyone conducting a proper investigation would see, there's no attraction involved in any of these cases and there's no void involved either;* these things propel parts of themselves around against other parts, and their movement is always due to the tendency of the parts to move from wherever they are towards their own proper site as they expand and contract. In short, he would see that all these 'miracles' are due to the ways in which things are entwined with one another.

Breathing, which is what we started out to investigate, is d
just another example of the same principles and processes,
as I've already shown. The fire chops up the foodstuffs and,
as it rocks back and forth inside us along with the breath, it
fills the veins from the abdomen; its surge draws the
chopped-up pieces from there into the veins. This is how
the streams of nourishment keep flowing throughout the
bodies of all living creatures. Now, the streams consist of
freshly cut fragments of food from things which are naturally
akin to the human constitution (cereals, fruit, and greens,
planted by the god for this specific purpose, to be our food) e
and the mingling of all these foodstuffs means that the
streams take on a wide variety of different hues, but the
predominant one in their case is red, the colour that is pro-
duced by fire as it cuts through and stains a moist environ-
ment. This, as we explained earlier,* is why what flows
through the body, which we call 'blood', looks as it does. It
is food for the flesh and the entire body, and by irrigating
each part of the body, it enables it thoroughly to replenish 81a
anything that is being depleted.

Both replenishment and wasting occur in conformity with
the general principle of movement in the whole universe—
that everything moves towards that with which it has natural
affinity. It's not just that the things around us are constantly
wearing our bodies down and scattering us in various direc-
tions by sending bits off towards the bulk of the stuff to
which they are naturally akin. It's also that the contents of
our blood, which have been chopped up inside us and have
become surrounded by the 'universe' that any living crea- b
ture constitutes for them, necessarily imitate this universal
movement.* In other words, it is by moving towards what
is cognate with it that each of the pieces inside us replen-
ishes any part which stands in need of replenishment at that
time.*

Wasting happens, then, whenever more is leaving a crea-
ture's body than is coming in on the bloodstream, and growth

is the opposite. When the structure of any creature is new, with the elementary triangles of the four bodies still fresh from the stocks, so to speak, the triangles are securely connected to one another, and the composition of the whole
c structure is supple, because it is newly made from marrow and fed on milk. Now, the triangles that enter the creature from outside (the triangles from which its food and drink are made) are older and weaker than the creature's own triangles, and so, once inside, they're overpowered and cut up by the fresh triangles; and this is what causes the creature to grow, since it is being nourished by plenty of assimilable substances. With each passing year, however, many such battles are fought by a creature's inner triangles against many such
d adversaries, and as a result the triangles' roots start to lose their grip — which is to say that they lose the ability to cut up incoming food into assimilable structures, and instead they themselves are easily broken up by the invaders from outside. When this happens, all creatures waste away and experience what we call 'old age'.

Eventually, the marrow's triangles, for all their tight connection, can no longer hold out against the stress and they come apart. In so doing, they loosen the bonds of the soul too and, since it has been freed under natural circumstances, it
e flies joyfully away.* For everything that is contrary to a thing's nature causes it pain, while everything that corresponds to its nature is pleasant. So, by the same principle, death that is caused by illness and wounds is painful and unnatural, while there's no death less troublesome than the one which accompanies old age on its journey to a natural end. Such a death comes with more pleasure than distress.

I'm sure everyone is perfectly well aware of the causes of
82a sickness. Since the components of a creature's body are four — earth, fire, water, and air — disorders and diseases occur as a result of abnormal predominance and deficiency among them,* and when one of them moves from its proper location to that of one of the others, and when any part of the body

acquires a form of fire or one of the other substances (all of which come in a plurality of forms) that is inappropriate for it, and so on and so forth. The reason is that each of these unnatural situations and shifts makes things change from cold to hot, from dry to wet, from heavy to light, and so on b
for all such qualitative changes. In fact, it is only, I dare say, the approach or departure of something that is identical with a given part of the body, corresponding to it in all aspects and qualities, that leaves it unchanged, sound and intact, while the departure or approach of something that is out of tune, something that fails to meet these conditions, is going to produce countless changes and no end of illness and decay.

Now, there are of course also structures which are bound to be second in order of construction, and so anyone want- c
ing to understand disease has to take a second look at it. Marrow, bone, flesh, and ligament are all compounds of the primary structures, and so is blood (though in a different way). Even though most diseases happen in the way I've already said, the worst and most severe diseases occur when the processes that lead to the formation of these secondary structures reverse, and they start to decay.

What I mean is this. In the normal course of events, flesh and ligament are made out of blood — ligament from its fibres (with which it is cognate), and flesh from thickened blood (the d
part of it that thickens when the fibres are removed). Then from ligaments and flesh there is secreted something sticky and oily which not only glues the flesh to the bones, but also actually feeds the bone that surrounds the marrow and causes it to grow. Some of this substance filters through the bones — though, because of the density of the bones, only those triangles that are so pure as to be exceptionally smooth and oily get through — and once inside it trickles and drips from the bones, and so irrigates the marrow.

When the process happens like this, the result is generally e
health, but when it's reversed, the outcome is invariably disease. For whenever decomposing flesh sends its putrefied

matter back into the veins, the blood, that courses copiously and with its varied constituents in the veins along with the air we breathe, becomes mottled with various hues, qualified by a complex mixture of bitterness, acidity, and saltiness, and contaminated by all kinds of bile, serum, and phlegm. The main havoc all these curdled and spoiled substances wreak is on the blood, which loses its ability to nourish the body, as it
83a carries these agents of destruction through the veins all around the body, without keeping any more to the natural order of circulation. And these substances are not only inimical to one another (since none of them does any of the others any good), but they are also hostile to any part of the body that has managed to stay intact and stand firm, and they set about destroying and decomposing it.

When it is very old flesh that decomposes, it resists assuagement and gains a darker hue (as a result of the prolonged burning it has undergone), and because it has been
b thoroughly corroded, in its bitterness it launches a severe attack on every part of the body that remains undamaged. Sometimes its bitterness becomes more attenuated than usual, and then the dark-hued matter gains an acid quality instead; at other times the bitter stuff gains a reddish hue, from having been steeped in blood, and the combination of this and the dark hue gives it a green colour. And when it is new flesh that is decomposed by the fire of the inflammation, the mixture includes an orange-yellow colour along with bitterness. Whatever its appearance, it has the same name—
c 'bile'—which was given to it either by some healers, or by someone capable of discerning within a plurality of things with dissimilar appearances a single generic form that deserves a single name. And each of the other things that we take to be a kind of bile has gained its own specific definition, depending on its colour.*

There are two kinds of serum, a harmless kind when it is a watery discharge of blood, and an aggressive kind when it derives from black, acidic bile and gains a salty quality by

being heated. This latter kind is called 'acid phlegm'. Then there's the stuff that's produced along with air by the decomposition of new, supple flesh. When this stuff is inflated by d
air and the whole package is enclosed within moisture, bubbles form, each of which is too small to be seen, but collectively they have enough bulk to be visible, in which case they appear as white in colour because of the froth that forms. The name we give to the totality of the matter deriving from the putrefaction of supple flesh and the air that is involved with it is 'white phlegm'. Moreover, the watery discharge of newly formed phlegm is what we call 'sweat', 'tears', and so on — whatever other similar substances there might be that e
are routinely purged from the body.

All these substances, then, become agents of disease when blood is not enriched, as is normal, by food and drink, but instead is augmented by pernicious substances, contrary to the normal course of events. Now, provided that the foundations that secure any part of our flesh that is being decomposed by disease remain secure, the effect of the affliction is halved, because the flesh can still easily recover. However, when the 84a
glue that binds flesh to bone is so diseased that it becomes detached simultaneously from flesh, bone, and ligament† — when bone is no longer being fed, and flesh and bone become disconnected, because as a result of an unhealthy way of life the glue has dried up and become harsh and salty instead of oily, smooth, and sticky — then all the stuff that this is happening to crumbles back inside the flesh and the ligaments as it becomes separated from the bone, and at the same time the flesh parts from its roots and leaves the ligaments bare and b
covered in salt. Also, the flesh itself collapses back into the bloodstream, where it intensifies the problems I've already mentioned.

Severe as these physical conditions are, there are more basic ones that are even worse; they occur when flesh is so dense that an insufficient quantity of breath gets through to it. The bone turns mouldy, the mould heats the bone up until

it mortifies, and then, so far from taking in food, bits that
c have crumbled off it go in the wrong direction and enter the food themselves. The food then enters the flesh, and bits of flesh collapse into the bloodstream and aggravate all the diseases I've already mentioned. But the very limit of severity in this category of disease is reached when the marrow becomes diseased, as a result of some specific deficiency or excess. This produces the most serious diseases, those that are more or less guaranteed to be fatal, as *all* the bodily processes necessarily reverse the direction of their flows.*

There is also a third category of diseases, which needs to
d be considered under three headings: those caused by the air we breathe, those caused by phlegm, and those caused by bile. When the lung, whose job it is to dispense the air we breathe to the body, is so clogged with fluxes that its channels are contaminated, the air fails to reach some parts of the body, and enters other parts of the body in unduly large amounts. In the first case the outcome is decay, brought on by lack of ventilation, while in the second case the air pushes its way through the veins so forcefully that it distorts them, until it reaches the midriff, the part with the diaphragm, where it gets trapped, and so the body begins to waste
e away. These conditions cause countless painful ailments, which are often accompanied by copious sweat. Also, the air that is produced inside the body by the disintegration of flesh often can't escape. This causes the same degree of acute distress as when air has come in from outside and got trapped, but the worst pain comes when the air produced inside the body settles around the ligaments and the tiny veins there and accumulates until its swelling forces both the tendons and the ligaments attached to them to stretch backwards. This state of tautness is, of course, what has given these ailments their names of 'tetanus' and 'opisthotonos'.* It's hard to find a remedy for these diseases, and in fact a fever, should one occur, is the most effective way of bringing them to an end.

Thanks to the air in its bubbles,* white phlegm is danger- 85a
ous when arrested, and although less harmful if it finds a vent to the outside of the body, it still stipples the body with its offspring — white pustules and cysts, and similar skin conditions. However, if a mixture of it and black bile is splashed onto the circuits in the head, the ones that are most divine, it throws them into confusion. This is less harmful if it happens during sleep, but harder to shake off if the attack comes while a person is awake. As a disorder of our sacred part, it is per- b
fectly named the 'sacred disease'.* Phlegm that is acid and salty is the source of all those ailments that involve fluxes from the head, the names of which vary according to the places into which they flow.

Whenever any part of the body is said to be 'inflamed' — that is, when it is hot and burning — the reason is bile, which causes either all sorts of itchy eruptions, if it finds a vent to the outside of the body, or a range of inflammatory condi- c
tions, if it remains shut up inside. The worst situation, however, is when bile infects pure blood and disrupts the usual, orderly arrangement of the fibres. These fibres are spread throughout the blood, with the job of ensuring that it remains in an equilibrated state between thinness and thickness — that it becomes neither so hot and runny that it flows out of the body's pores, nor too thick and inert to circulate readily in the veins. The fibres were created and constituted to pre- d
serve a fine balance in this context. Even after death, when the blood is cooling down, if the fibres are gathered together all the rest of the blood becomes runny, while if they are left in place the combined action of the fibres and a cool environment soon causes the blood to clot.*

In the situation under consideration, bile has been dissolved out of flesh and back into the blood from which it was originally formed. At first, its invasion of the blood is gradual, and being hot and wet, it's thickened by the action of the fibres, since this is their job in the blood; and as it congeals, e
with its heat being forcefully quenched, it produces internal

chills and shivering. But as more of it pours in, the heat it gives off overpowers the fibres, and its seething agitates them and throws them into disarray. If there's enough of it to see its victory through to the end, it penetrates the marrow, where in short order its heat loosens the soul's cables (to use a nautical image) and sets the soul free.* If there's too little of it, however, and the body resists the process of dissolution, the bile suffers defeat and is either driven out onto the surface of the body as a whole, banished from the body like an exile from a feuding city,† or is compressed through
86a the veins and into the upper or lower abdomen, where it causes diarrhoea, dysentery, and all similar complaints.

Ill-health in the body may be due mainly to an excess of fire (which causes continuous burning and fevers), or to an excess of air (which causes quotidian fevers*), or to an excess of water (which causes tertian fevers, because it's more sluggish than air or fire), or to an excess of earth (which, as the most sluggish of the four, causes quartan fevers, which are hard to shake off).

b So much for physical disorders and their causes, and now for diseases that affect the soul as a result of a physical condition. This is how they occur. It's indisputable that mindlessness is a disease of the soul, and since there are two kinds of mindlessness — madness and ignorance — it follows that everything which happens to a person that causes him to become either mad or ignorant must be called a disease. So we should count excessive pleasures and pains as the most serious diseases that can afflict the soul, because when a man is over-
c joyed or, conversely, suffering from pain, he's so immoderately concerned to gain the one or lose the other that he's incapable of seeing or hearing anything aright. In short, he's in a state of frenzy and, for as long as it lasts, he completely loses the ability to think rationally.*

When there's a build-up of seed in a man's marrow, and it becomes copious and profuse, like a tree overladen with fruit, his desires and their satisfaction bring him agony and

pleasure, time after time. The pleasures and pains are so intense that he spends most of his life in a crazed state, but although his soul has been infected with mindlessness by his d
body, he's not generally held to be ill, but to be a bad man, by his own choice. In actual fact, however, sexual incontinence is a soul-sickness caused largely by the presence in the body, thanks to the porousness of the bones, of just a single substance, in profuse enough quantities to moisten it. And indeed, hardly any of the bad behaviour which is commonly attributed to lack of control in the face of pleasure and is said to be shameful, as if it were freely chosen, should really be held against a person. For no one is bad of his own choice:* e
an unhealthy body and a vulgar upbringing are what make a bad man bad, and these are afflictions that no one *chooses* to have.

Where pain is concerned as well, the same principle applies: a poor state of the soul is often due to the body. A person's acid and salty phlegm, or† his bitter and bilious fluids, can get trapped inside the body, without finding an outlet, and then they roam around the body. If they encoun- 87a
ter the motion of the soul and interaction takes place between it and the vapours they give off, all kinds of diseases arise, which vary in severity and frequency. These diseases might be carried to any of the soul's three locations* and, depending on which one they assault, they create a complex syndrome either of obstinacy and gloom, or of rashness and hesitancy, or of forgetfulness and mental dullness.

In addition, when men who are constitutionally unsound, b
as I've been describing, live in cities with pernicious political systems and hear correspondingly pernicious speeches at home and in public, and when, moreover, what they learn from childhood onwards does nothing at all to remedy all this, these two factors, which have nothing whatsoever to do with one's own choice, are responsible for the badness of those of us who become bad. We should always blame the sowers rather than the seed, and the teachers rather than the

taught, but we should still do our best to ensure that our environment, our occupations, and our education help us to prefer good to bad.

This topic belongs to another kind of speech, but now it is
c right and proper that we should discuss in its turn the counterpart to these issues, namely how to tend to our bodies and minds to keep them safe and sound. After all, good has more of a claim on our attention than bad. Now, anything good is beautiful, and nothing beautiful lacks proportion, so we are bound to expect a healthy creature to be a well-proportioned creature. But although we discern and think rationally about trivial cases of proportion, we're incapable of reasoning when it comes to the most important and significant cases. For
d instance, the factor that has the most bearing on health and sickness, and on moral goodness and badness, is whether or not there's proportion between soul and body, but we don't consider these things at all. We fail to see that when a relatively weak and frail body is the vehicle for a soul that has no weakness or pettiness in it, or when the combination of the two of them is imbalanced in the opposite way, the creature as a whole lacks proportion in the most important respects, and therefore lacks beauty. However, for those capable of seeing it, a creature whose soul and body are in balance is a vision of the utmost beauty and attractiveness.

e Think, for example, of a body which is out of proportion with itself, in the sense that it has one leg longer than the other or some other abnormality: it's not just that it's ugly, but also that it makes a lot of trouble for itself in a work context, as its lurching gait exhausts it and makes it liable to all sorts of injuries and accidents. The same goes, we're bound to think, for the complex of soul and body that we call a living creature. Suppose its soul is stronger than its
88a body. When the soul gets abnormally passionate, it makes the whole body quiver from within and fills it with illnesses; and when it's intent upon study and research, it causes the body to waste away. Or again, when it's involved in teaching

or disputation, in public or in a private house, surrounded by arguments and competitiveness,† it heats the body and churns it up, and induces fluxes, which fool most so-called healers into blaming the innocent party. On the other hand, the balance of power might lie with the body rather than the soul, so that a strong body has a petty, weak mind attached to it. If so, of the two fundamental desires that human beings b possess — the bodily desire for food and the desire of the most divine part of us for knowledge … well, when the impulses of the stronger part win and reinforce their favourite, they turn the soul into something obtuse, dull, and forgetful, and give it the worst of all diseases, ignorance.

There's only one way to protect oneself against both these situations, which is not to exercise the soul to the exclusion of the body, nor the body to the exclusion of the soul. Then, evenly balanced and healthy, each is able to resist the other. So the mathematician or the enthusiastic cultivator of any c other intellectual pursuit has to pay his debt of physical exercise by attending the gymnasium, and someone concerned with developing his physique has to compensate with exercises for the soul by addressing all kinds of cultural and philosophical pursuits. There's no other way for a man to come to have a genuine claim to both the two epithets 'beautiful' and 'good' at once.*

The same principle also holds good when it comes to treating parts of the body, where the body of the universe should be our model. The inside of the human body is heated d and chilled by things that enter it, while its outside is dried and moistened by external objects. If the body, which is affected in these and related ways by impulses from both inside and outside, is subjected to these changes while unmoving, it is overpowered and ruined. On the other hand, if someone takes what we called the nurse and the nurturer of the universe as his model, and allows his body to be still as rarely as possible, by keeping it constantly and thoroughly stirred up by exercise, e he provides it with a natural means of resistance to the inner

and outer impulses. By keeping the qualities and fragments that roam according to their natural affinities around the body in a state of moderate agitation, he orders and organizes them in relation to one another, along the lines of what I was saying before about the universe.* By separating enemies he stops discord and disease arising in the body, and by grouping friends together instead he creates a sound constitution.

89a Now, the best kind of movement is one that is generated by oneself within oneself, because there's no movement that has more natural affinity with the movement of the thinking part and of the universe as a whole. Somewhat worse than this is any externally generated movement, but worst of all is the one that affects only parts of a supine, still body, and uses substances that are different from the bodily parts affected. It follows, where means of purging and restoring the body are concerned, that the best is exercise, and the second-best is being rocked on a boat or some other vehicle that isn't an exhausting ride. The third kind of change, however, should b be a last resort in dire emergencies and never otherwise accepted by a man of intelligence. This is the medical use of drugs to purge the body.*

The point is that, except in cases of grave danger, diseases should not be exacerbated by the use of medicines. All illnesses structurally resemble living creatures, in the sense that the composition of creatures lasts for an ordained number of years, not only as members of a given species, but also as individuals: each individual creature comes into existence with a c predetermined lifespan, leaving aside unavoidable accidents. This is because, right from the start, every creature's triangles are put together with the capacity for lasting a certain amount of time,† beyond which it cannot possibly remain alive. Diseases have analogous structures, and so if one tries to eliminate a disease by the use of drugs before its time, problems are liable to increase both in severity and number. Hence, control of this whole area should be achieved by means of regimen, to the extent that one has time to do so, and one

should avoid exacerbating an obstinate nuisance by the appli- d
cation of drugs.*

So much for both the composite living creature and the part of it that consists in the body; we've spoken enough about what a person has to do, in terms of controlling and being controlled by himself,* to give himself the best chance of living the life of reason. But it's even more important that we should first do all we can to ensure that the controlling part itself is in the finest and best possible condition for the task of exercising control. It would be a hard enough job to discuss this topic in detail on its own, without covering any- e
thing else, but a casual treatment along the lines of what's already been said might not go amiss as a way for me to bring my speech to a conclusion.

So let's look at it this way. As we've already said a number of times, there are three kinds of soul lodged within us. Since each of them has its own movements, it will take us no time at all to follow the same principle as we did just now and assert that whichever of them passes its time in idleness, with its own movements stilled, is bound to be the weakest of them, while the one that constantly exercises is bound to be the strongest. And from this it follows that we should take care to ensure that they keep their movements in proportion with 90a
one another.*

As far as the most important type of soul we possess is concerned, we are bound to identify it with the personal deity that was a gift of the god to each of us. This, of course, is the kind of soul that dwells, as we said, in the summit of our body, and it raises us up from the earth towards the heavenly region to which we are naturally akin, since we are not soil-bound plants but, properly speaking, creatures rooted in heaven. For it is from heaven, where our souls originally came into existence, that the gods suspended our heads,* which are our roots, and set our bodies upright. b

When a man is caught up in his appetites or his ambitions and devotes all his energies to them, the mental processes

that go on inside him are bound to be restricted entirely to mortal beliefs, and he himself is bound to be completely and utterly as mortal as a man can be, since that is the part of himself that he has reinforced. But anyone who has devoted himself to learning and has genuinely applied his intelligence — which is to say, anyone who has primarily
c exercised his intellect — cannot fail to attain immortal, divine wisdom, if the truth should come within his grasp. He achieves the full measure of immortality that is possible for a human being, and because he always takes care of the divine part of himself and maintains the orderly beauty of his companion deity, he is bound to be exceptionally blessed. But there is only one way that anyone can take care of anything, and that is by giving it food and exercise that is congenial to it.* So, since the movements that are naturally akin to our divine part are the thoughts and revolutions of the universe, these are
d what each of us should be guided by as we attempt to reverse the corruption of the circuits in our heads, that happened around the time of our birth, by studying the harmonies and revolutions of the universe. In this way, we will restore our nature to its original condition* by assimilating our intellect to what it is studying and, with such assimilation, we will achieve our goal: to live, now and in the future, the best life that the gods have placed within human reach.*

e And so it looks as though we have now pretty much achieved the target originally set us of explaining the creation of the universe from the beginning up to the origin of human beings. But we should just briefly mention how all other creatures came to exist; it won't mean prolonging the speech much, and we'll be able to judge ourselves to have given a more balanced account.

We may take the following, then, as our account of this topic. Some men, once they had been incarnated, lived unmanly or immoral lives, and it's plausible to suggest that they were reborn in their next incarnation as women. That,
91a therefore, was when the gods invented sexual desire,* a living

being that they formed, though different in men and in women, and endowed with a soul. Here's how they made each of these creatures. At the point where the channel for drink receives liquid (once it has passed through the lung, behind the kidneys, and into the bladder) and discharges it under pressure from air, they bored a channel into the marrow they had constructed, that extends from the head, down through the neck, and through the spine — that is, the marrow we b described earlier as seed. The marrow, as something endowed with soul and now granted an outlet, generated, in the part where the outlet is, a lively appetite for emission and the result was the male yearning for procreation. And this is why men's sex organs, like a creature which is incapable of listening to reason, are disobedient and headstrong, and, goaded by their frantic appetites, try to have everything their way.

To turn to women and the 'womb' or 'uterus' they pos- c sess: there exists inside the womb, for the same purpose, a living being with an appetite for child-making, and so if it remains unproductive long past puberty, it gets irritated and fretful. It takes to wandering all around the body and generating all sorts of ailments, including potentially fatal problems, if it blocks up the air-channels and makes breathing impossible. This goes on until a woman's appetite for childbearing and a man's yearning for procreation bring the two of them together and they strip the fruit from the tree, so to d speak. They sow in the field of the womb tiny creatures, too small to be seen. At first not fully formed, these creatures then become articulated, while the womb nourishes them until they've grown enough to emerge into the light of day. The result of this process, then, is the creation of living creatures.

So this is how women and females of any species were created. Birds, however, are a mutant tribe, sprouting feathers instead of hair; they are reincarnations of men who had no badness in them, but were lightweight, in the sense that although they studied the heavens,* they were foolish enough

e to think that their arguments would never be perfectly secure unless they personally witnessed the phenomena.

Land animals, a brutish race, are reincarnations of men who never applied themselves to philosophy and never pondered the nature of the heavens, because they stopped making use of the circuits in their heads and instead followed the lead of those aspects of the soul that reside in the chest. This way of life bowed their upper bodies and heads down, by the principle of natural affinity, until their forelimbs rested on the ground, and their heads became elongated or otherwise
92a oddly shaped, depending on how an individual's revolutions shrank from disuse. This explains why animals of this kind have four or more legs, and the more mindless they were, the more such underpinning the gods gave them, to draw them even closer to the ground. As for the most mindless of them,* the ones with their whole bodies level with the ground, the gods made them without feet, since they no longer needed them at all; these are the creatures that crawl along the ground.

b Aquatic creatures make up the fourth kind, and they are reincarnations of especially stupid and ignorant men. In transforming them into these creatures, the gods decided that they no longer deserved even to breathe pure air, since their tasteless behaviour had sullied their souls with impurities, and so, instead of letting them breathe fine, pure air, they forced them down into the murky depths of water, to do their breathing there. This is how all aquatic creatures came into existence, such as fish and shellfish, and they have been assigned the lowest realm as a penalty for having plumbed the
c lowest depths of ignorance. These principles apply just as much now as then, and they determine the interchangeability of creatures and how their changes are influenced by their losing or gaining intelligence.*

So now we may say that our account of the universe is at last complete, since we have explained how this world of ours

obtained its full complement of mortal and immortal creatures. It was created a visible living being, encompassing within itself those creatures that are visible; it was created a perceptible god, made in the likeness of the intelligible god. This universe of ours is single, the only one of its kind: there is none greater or better, none more beautiful, none more perfect.

EXPLANATORY NOTES

TIMAEUS

17a *where's the fourth of yesterday's guests?*: we do not know who this missing fourth person, who has fallen ill, might be, nor why Plato has Socrates refer to him.

17b *Only partly*: Timaeus, Critias, and Hermocrates have forgotten at least part of what Socrates spoke of yesterday, giving Socrates a cue to give a summary, which will set the background for the main speeches of Timaeus and Critias.

17c *the political one*: Socrates proceeds to give a summary of the previous day's conversation. It has strong affinities to material presented in books II to V of *Republic*, concerning the organization of the ideal state, but leaves many other aspects of *Republic* untouched. We must take into consideration that what we in the twenty-first century find of interest or importance in *Republic* may differ from what Plato believed to be interesting or important. Even given that, though, it is hard to see that any summary of *Republic* could be complete without the analysis of the tripartite soul, the analogy between soul and state, and the allegories of sun, line, and cave. If the memory of those present is correct, yesterday's conversation cannot have been the whole of *Republic*. That is not problematic, as there may well have been other occasions when Socrates spoke of these issues, or Plato may have invented a fictional occasion.

19a *yesterday's conversation*: the preceding material has resembled some of the political theory of *Republic*. As with *Republic*, there is to be a separate warrior class to defend the city, while all other men have a single specific trade; these guardians are to have a special education and will live communally without private possessions; and the state will discretely manage marriage, procreation, and the nurture of children (*Republic* 459a ff.).

19b *someone who had gazed on . . . living creatures)*: see *Republic* 472d ff. (cf. 498d ff., 592a ff.), where Socrates compares his description of the ideal city to a painter who has produced a good portrait, but cannot prove that the subject exists.

19c *as it goes to war*: Plato's politics and vision of an ideal state are quite militaristic. In this he may well have been influenced by Athens' defeat by Sparta and the subsequent political unrest and upheavals in the city, and also by Athens' victory over the Persian invaders at Marathon, which he regards as the city's finest hour.

19d *in these respects*: this is typical self-deprecation by Socrates. In Plato's works Socrates often claims to know nothing, but proves very adept at discovering flaws in what other people claim to know. Nor is Socrates a politician, in the sense of running for office, nor is he a writer (if Socrates himself wrote anything, nothing survives), nor is he an orator, in the sense of someone using rhetoric to generate a fine speech about Athens.

19e *As for the sophists*: Plato generally has a very low opinion of the Sophists, men, according to him, who took either side of an argument depending on circumstances, and were paid to do so, rather than being concerned with the truth.

19e *That leaves only people with your qualifications*: Timaeus, Critias, and Hermocrates have philosophical ability and experience as well as political ability; cf. *Republic* on the ideal ruler.

20c *Hermocrates*: This is Hermocrates' only speech in *Timaeus*. He does not speak again until a short speech at the beginning of *Critias*.

20d *a story which, for all its strangeness, is absolutely true*: Critias claims that his story is entirely true; Timaeus will claim that his account of the origins of the cosmos and the origins of man is a 'likely account'.

20e *Solon, the wisest of the seven sages*: Solon was a noted Athenian statesman, responsible for revising the constitution of Athens early in the sixth century BC. The seven sages were the traditional wise men of Greece, dating back to 800–500 BC.

20e *in his verses*: not in any of the surviving fragments, which focus almost exclusively on describing and justifying his political reforms.

20e *the destruction of human life*: Plato seems to have believed in periodic catastrophes which destroy most of human life, cf. *Statesman* 270c ff., *Critias* 111a ff., *Laws* 677a ff.

21a *her festival*: the Panathenaea, the most important festival in Athens for the city's patron, Athena. It was celebrated towards the end of July each year, and with special splendour every four years.

21b *the Koureotis of the Apatouria*: an Athenian festival in late autumn where, on the third day (named 'Koureotis' after a Greek word for 'youth'), new male children were presented to their father's phratry — literally 'brotherhood', a kinship organization with religious and social functions.

21d *Who told him it was true?*: if we are to accept the word of Solon and Critias that the tale is true, it is important to know who told Solon that it is true.

21e *King Amasis*: Herodotus also tells us that Solon travelled in Egypt at the time of King Amasis (see Herodotus 2. 172 ff., on Amasis). As Amasis came to the throne in 570 and Solon died in 560 this is possible, though Plato has Solon visiting Egypt prior to his constitutional reforms, which is less likely.

22b *he was talking about*: in Argive legend Phoroneus was an early, or even the first, ancestor; his daughter Niobe was the founding mother, by Zeus, of the Argive race. The Noah-like legend of Deucalion and his wife Pyrrha has them warned that Zeus was going to destroy the corrupt human race; they built a boat, stocked it with provisions, and rode out the deluge before restocking the earth with human beings. It sounds as though Solon attempted to systematize and rationalize the chaos of Greek legend in the way that several Greek proto-historians of the fifth century had done.

22d *a real event*: so myths can be disguised truth. This may be a model for how we are to think of the Atlantis story — as true, not in the sense that it describes hard historical facts, but in the sense that it communicates a general truth, in this case how the ideally good citizens of Plato's *Republic* would behave if they were to become actual.

22d *the deviation of the heavenly bodies*: Critias' tale contradicts what Timaeus will say about the cosmos. The cause of the periodic destruction of human beings is a shift in the bodies which orbit the earth. Not only is there no mention of this in Timaeus' account, but it runs against the general notions of cosmic stability, and in particular it is contrary to the notion of the predictable great year. The Greek word here for deviation, *paralattein*, can be found in the cosmological accounts of the *Republic* and the *Statesman*, but not in Timaeus' account.

22d *by being released*: the Egyptians had a complex system of floodable canals attached to the Nile for irrigation purposes. The old priest's suggestion seems to be that releasing the river-water into this network of canals keeps the land and its inhabitants from being scorched by the cosmic fire.

22e *rises up from below*: Egypt's lack of rain was notorious, and it had a largely flood-plain agriculture. The Nile would flood, inundating a wide flood basin, and would deposit fertile silt which was farmed when the Nile receded. Why the Nile flooded was a matter of speculation, as it was not related to rain. It is in fact due to melting snow much nearer the Nile's source.

23e *a thousand years later*: the antiquity and primacy of Egypt was almost universally acknowledged among the Greeks, and so this statement of the primacy of Athens is truly remarkable. In Athenian legend Erichthonius, their first ancestor, was the offspring of the deities Earth and Hephaestus (or the elements earth and fire), after Hephaestus' seed had spilled onto the earth during a bungled rape of Athena. How will that fit with Timaeus' account of the origins of humans? Cf. *Critias* 113c–d, where there again seems to be at least one man born from the earth.

24b *the example of the goddess*: the goddess Athena was traditionally armed with a spear and a shield.

24d *men of outstanding intelligence*: the idea that Athens had a climate conducive to producing intelligent men is common in Greek literature — cf.

Euripides, *Medea* 826–9; ps.-Hippocrates, *Airs, Waters, Places* 5; Aristotle, *Politics* 1327b.

24e *Pillars of Heracles*: the straits of Gibraltar.

25a *that genuine sea*: Greek geography recognized three continents (Europe, Asia, and Africa, in our terms) grouped around the Mediterranean, with a further sea surrounding all of them. Here Plato supposes a further continent surrounding the outer ocean.

25b *Etruria*: specifically the central part of Italy, but here meaning Italy as a whole.

25c *abandoned . . . brink of disaster*: this description sounds rather like the plight of Athens in the Persian invasion of 480–479 BC.

26c *for permanence*: the 'encaustic' method of painting involved applying coloured waxes to a surface and fixing the colours in place by means of a heated metal rod. It was used especially for painting difficult surfaces such as stone, or other objects that would stand outdoors.

26e *a true historical account*: Socrates is delighted with Critias' story, though he gives no grounds or criteria for his judgement that it is true.

27a *specialized in natural science*: we know nothing of any real Timaeus, but the fictional characteristics suit him well for the task of describing the origins of the cosmos and of man. 'Natural science' was a broad discipline, covering everything from cosmology and astronomy and the laws of nature, to biology and medicine.

27a *from you*: from Socrates, because Critias has already identified the citizens of bygone Athens with those of Socrates' imaginary community (26d).

27d *what is it that always is . . . never is?*: Timaeus begins his discourse with a distinction that will affect the nature of his whole account, between being and becoming. Some things (i.e. forms) always are, without ever changing, while others undergo change. The verb 'to become' in Ancient Greek has two different senses. It can mean to come into existence (or be created), or it can mean to come to be something.

28a *object of belief, supported by unreasoning sensation*: the things that do change are those of the world about us, which we perceive with our senses. Similar views are expressed in *Republic* (510 ff.), where Plato develops the analogy of the divided line, to explicate his views on knowledge. A line is divided into four sections (**L1–L4**), with types of belief/knowledge correlated to types of entity. The task of the philosopher is to ascend the line (cf. the cave analogy of *Republic*, which follows on from the divided line).

noêsis, understanding	**L4**	*epistême*, knowledge	Intelligible entities
dianoia, intelligence	**L3**		
pistis, belief	**L2**	*doxa*, opinion	Sensible entities
eikasia, illusion	**L1**		

So Timaeus will deny that we can have knowledge, in the strong Platonic sense, of the world about us and we have to settle for opinion.

28a *anything created is necessarily created by some cause*: a strong principle, which lays the foundations for the view that as the cosmos has come into being, it too must have a cause.

28b *did it always exist . . . in the first place?*: another key question for Timaeus' account. Has the world come into existence, or has it always existed? If it has come into existence, he will have to explain how and why it came into existence. And his answer is unequivocal—it has come into existence.

29a *two kinds of model*: it is not clear that Plato gives a real choice between the two models that the demiurge may base the cosmos on. What would the changing model be? The conclusion, that the demiurge bases his work on the eternal model, is no surprise, though it is not entirely clear what the eternal model is either. Timaeus' argumentation here is far from watertight; he is effectively presenting an overview in an introductory speech.

29b *are themselves stable and reliable*: our accounts of the stable, intelligible entities have to be stable themselves and entirely reliable, or in other terms, have to be secure knowledge, while (29c) our account of what are likenesses, on the other hand, can be no more than likely. Note the word-play (see p. xxxiv).

29c *to the plausibility of the other*: the analogy is again reminiscent of the divided line of *Republic*.

29c *impossible to give accounts that are . . . perfectly precise . . . as plausible as anyone else's*: the account that Timaeus will give will deal with the physical, sensible world and so can be no more than likely, but he will make sure that it is as good as or better than any other account of the world. There are certain affinities between Parmenides' poem and Timaeus' speech here. Both separate the objects of reason and sensation, reckoning these to be co-ordinate with what is knowable and what is opinable, and both require explanations to be similar in type to what they explain (see especially Parmenides, Fr. 1 28 ff.). We might also compare Timaeus' repeated use of *eikos* to describe the status of any account of the physical with Parmenides' similar usage at Fr. 8 60–1, 'I tell you this way of composing things in all its plausibility, so that never shall any mortal man outstrip you in judgement.'

29d *You're absolutely right*: unlike the Socrates of Plato's earlier works, here Socrates is remarkably compliant, as he was with Critias too.

29e *being free of jealousy*: this establishes a theme for the whole of *Timaeus*. Whoever constructed the cosmos is good, and has no jealousy: he desires that everything should be as good as possible; he creates maximum order, as order is always better than disorder. This passage marks the

culmination of a move away from the gods of Greek myth. Contrary to those gods, the generator of the universe is entirely good and entirely free from jealousy (see also pp. xxxii–xxxiv). For the first time, an independent creator is focused solely on the good.

30a *moving in a discordant and chaotic manner*: prior to the intervention of the demiurge, there is chaos. The demiurge will not only establish order, but will also generate harmony in the cosmos.

30a *in all ways better*: a basic assumption throughout *Timaeus* is that order is better than chaos.

30c *endowed . . . with soul and intelligence*: see pp. xxiv–xxvi for why the cosmos needs to be intelligent.

30c *living being the maker made the universe in the likeness of*: quite what Plato has in mind here is unclear. Is the universe modelled on some type of living creature, or on the form of living creatures?

31a *an infinite plurality*: the early atomists Leucippus and Democritus had supposed there to be an infinite plurality of worlds, all occurring due to chance and necessity rather than by any design, but for Plato there is one and only one universe, and it is designed.

31b *is and always will be a unique creation*: Plato has emphasized that there is only one world at any one time, and here he emphasizes that there is only one world through time as well. Prior to Plato, Empedocles had held that, although there was only one world at any one time, it would eventually be destroyed and replaced by another world in an unending cycle.

32a *three solids or three powers*: the reference here may be to cubic and square numbers. See F. M. Cornford, *Plato's Cosmology* (London: Routledge & Kegan Paul, 1937), 44.

32c *can be taken apart only by him who bound it together*: so apart from earth and fire, two more constituents are required for the cosmos, water and air. However we interpret Plato's somewhat obscure remarks about proportion here, the consequence is clear enough. When the cosmos is put together in this way, it becomes a unity, dissoluble only by the creature who bound it together. In what follows, the cosmos will be presumed to be exhaustive of the constituents, so it cannot be attacked from the outside; here we find that, thanks to its internal cohesion through proportion, it will also not deteriorate of itself.

33a *unageing, and untroubled by disease*: the assumption being that it will not become ill or age of itself without external interference.

33b *so he made it perfectly spherical*: the idea that one shape is better than another is a strange one to the modern mind, but came quite easily to the ancients, especially those with a strong teleology.

33b *vastly superior to dissimilarity*: another basic supposition of *Timaeus*, like the earlier idea that order is in all ways better than chaos; we will

shortly meet another such axiom, that self-sufficiency is better than dependency.

33d *equip it with hands*: Plato may describe the cosmos as a living entity, but this is no simple anthropomorphism or animism, as we can see here from the description of the cosmos. There may well be assorted criticisms of some presocratics implicit here too, notably perhaps the Pythagoreans. Quoting Aristotle's lost *On the Pythagoreans*, Stobaeus tells us that: 'The universe [according to the Pythagoreans] is unique, and from the infinite it draws in time, breath and void, which distinguishes the places of separate things' (Stobaeus 1.18.1, Wright's translation and brackets (1995), 62). So too the idea of a unique, self-sufficient, and exhaustive cosmos tells against the views of the atomists. One might also compare Parmenides' 'well-rounded sphere' from his *Way of Truth*, though the differences from Parmenides are perhaps more important than any such similarities. Plato's cosmos is alive and in motion, has a beginning, is not homogenous, and is designed to support life.

34a *the other six kinds of motion*: the cosmos has perfect regular circular motion. It has no part in any of the other six motions (up, down, left, right, forward, back), so there can be no metaphysical reason, relating to the imperfection of the sensible world, why there cannot be entirely regular circular motion.

34a *he created it without legs and feet*: the apparently trivial fact that the cosmos has no feet is significant for two reasons. It is the culmination of a line of thought beginning with Thales — why does the earth not fall? This is now treated with full generality — why does the cosmos, the totality of everything, not fall? Secondly, in previous works (notably *Republic* and *Statesman*; see pp. xxii–xxiv) Plato has the cosmos turning on a pivot. Now it does not need any such support, nor is motion going to be affected by any friction from a pivot. The cosmos will not wind down and be in need of the intervention of deities as it is in *Republic* and *Statesman*.

34b *the god who exists for ever took thought for the god that was to be*: rephrased, the demiurge (the god who always exists) took thought for the world-soul (the god who is generated).

34c *the coincidence and contingency that characterize our lives*: this may be one reason why we can have only a likely account of the cosmos, though 37b–c and 44b–c suggest that it may be something we can at least attempt to control or ameliorate.

35a *third kind of substance*: the reason for this mixing will become clearer. Essentially, perception takes place by the principle of like to like, so soul must have a part in the unchanging to have some cognition of forms and so on, and some part in the changing to perceive bodies. So the third substance is a blend of indivisible and never-changing substance, so it

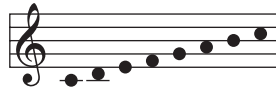
will be able to apprehend and make judgements about the intelligible, and of divisible and changing substance, so that it will be able to perceive and make judgements about the sensible.

35a *difference does not readily form mixtures*: so this process could not occur accidentally and the action of the demiurge is required. Just as the physical cosmos could not have come together accidentally, but needs a provident designer, so the world-soul does too.

36a *twenty-seven times the quantity of the first*: this gives us the sequence: 1–2–3–4–9–8–27.

36a *exceeded by the other extreme*: Timaeus treats 1–2–3–4–9–8–27 as two sequences, 1–2–4–8 and 1–3–9–27, and goes on to fill these intervals with the harmonic means (2ab/a+b) and the arithmetic means (a+b/2), giving a sequence of: 1–4/3–3/2–2–8/3–3–4–9/2–16/3–6–8–9–27/2–18–27.

36b *were 256 : 243*: there is then some further filling of intervals where multiplying one of the numbers in this sequence by 9/8 does not exceed the next number in the sequence. So the first part of the sequence will run: 1–9/8–81/64–4/3–3/2–27/16–243/128–2. These divisions have a musical significance, as 3/2 represents a musical fifth, 4/3 a fourth, 9/8 a tone. The remainder between the 9/8 multiplications and the next number is 256/243, close to a semitone. In musical notation, beginning with C for the sake of simplicity, we can represent this sequence as follows:

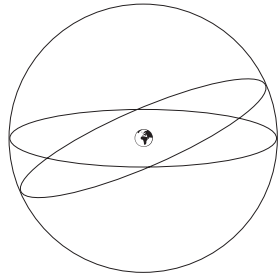


This represents the notes C, D, E, F, G, A, B, C. Further notes above these will be generated by the division of the sequence from 2 to 27, covering three-and-a-half octaves. Plato stops with the seventh term, 27, as there are only five planets in addition to the sun and moon. There is a need to go as far as the seventh term to generate the harmony of the heavens, but no need to go any further. In *Timaeus* and subsequent works there is no mention of any audible harmony of the heavenly bodies. There is a harmony to the structure of the world-soul, but no sound. This differs from the Pythagoreans, and also differs from the Myth of Er at 617b–c of *Republic*.

36b *was all used up*: the soul-stuff is entirely used up, as the physical stuff of the cosmos was.

36c *a point opposite their original junction*: the demiurge splits the soul-stuff lengthwise and joins the two resulting lengths together, initially as a

Greek letter *chi*, X, and then joins the limbs of the *chi* together. This can be represented like this:



The horizontal arm of the *chi* will move the whole cosmos in a once-a-day rotation. The other arm of the *chi* will move the sun, moon, and five planets relative to the fixed stars.

36d *seven unequal rings*: this gives the orbits for the sun, moon, Mercury, Venus, Mars, Jupiter, and Saturn.

36d *three of them being similar in speed*: the sun, Mercury, and Venus, with the 'other four' being the moon, Mars, Jupiter, and Saturn.

37b *the same*: the world-soul, *qua* compounded from being, sameness, and difference, is able to make judgements concerning being, sameness, and difference in whatever it encounters. Note that 'identity' has occasionally been used in the translation instead of 'sameness', in order to cover not just judgements of the form 'This is the same as that', but also 'This is the same as itself'.

37b *that which is eternally consistent*: so the soul can not only compare material objects to one another (as identical or different), but can also compare material objects to immaterial objects (e.g. 'this apple both resembles and is dissimilar from the Ideal Apple'). This latter kind of judgement gives us, as possessors of soul, access to the world of Platonic forms: see *Phaedo* 74c.

37b *beliefs and opinions . . . are the result*: even for the world-soul there is a difference between judgements about intelligible entities and those concerned with perceptible entities. As at *Timaeus* 27c–28d, we can have knowledge of the intelligible but only opinion of the sensible. The world-soul may have true opinion, but for Plato there is a considerable difference between true opinion and knowledge.

37c *the place where belief and knowledge arise*: it is a typically Platonic belief that knowledge is generated by the soul, not by the brain, the blood (some presocratics believed that we think with the blood), or the senses.

37d *while eternity abides in oneness*: this contrast is important for *Timaeus*. The physical cosmos is less perfect than what it is a model of. Does this

mean that it moves in an irregular manner? No, because the contrast is framed as one of movement according to number, as opposed to stability.

37d *'time'*: if the motions are time, and time is regular (and nowhere does Plato suggest otherwise), then the motions must be regular too.

37e *before the creation of the universe*: measured and orderly time only comes into being with the ordering of the cosmos. Prior to that there are no days, nights, months, or years.

37e *mistakenly apply to that which is eternal*: 'was' and 'will be' are tenses which apply to things which change. Only 'is' is appropriate in the description of things which do not change.

38b *now is not the appropriate moment*: Plato shies away from a full metaphysical discussion of time and tenses. The second part of *Parmenides* contains several arguments about time.

38c *the model exists for all eternity, while the universe was and is and always will be for all time*: this is all that Plato needs to get out of this discussion of time here—a reasonable contrast between eternity and time, and how the cosmos can be said to be in time.

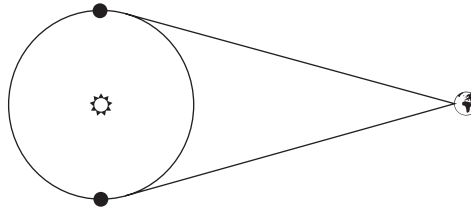
38c *were created to determine and preserve the numbers of time*: this is the purpose the demiurge has in creating the sun, moon, and planets. They must move in a regular fashion if they are to distinguish and preserve time.

38d *sun into the circle second closest to the earth*: this is typical of the order of the heavenly bodies in early, geocentric astronomy.

38d *assigned them tendencies that oppose it*: as Mercury (Hermes) and Venus (the Morning Star) change their position relative to the sun (see next note), they cannot have exactly the same speed as the sun but must have some other motion as well. Does the 'opposing tendency' invoked here for Mercury and Venus entail a breach of the principle of regular circular motion? It is possible that Plato does not give us the full details in this compressed account, and the opposing tendency involves further regular circular motions, or that Plato knew there was a problem here which he as yet had no solution for, but hoped would be solved by further regular circular motions; see pp. xli–xlii.

38d *constantly overtake and are overtaken by one another*: it is important to be aware of which phenomenon is being referred to here. In modern terms, Mercury and Venus are inferior planets, that is, the radius of their orbit around the sun is less than that of the earth, while Mars, Jupiter, and Saturn are superior planets, having larger orbits than the earth. This is significant because of the limitations of where inferior planets can be seen in relation to the sun: Mercury and Venus are always seen relatively close to the sun. In the following diagram, the inferior planet is at its maximum angular distance from the sun relative

to the earth. Move the earth anywhere else in the diagram, and the angle will be less:



Mercury and Venus will sometimes appear to precede the sun, and sometimes to follow it. In practical terms, Mercury and Venus are seen fairly low on the horizon either just before sunrise (when they precede the sun) or just after sunset (when they follow the sun). So at one extreme of their orbits of the sun, Mercury and Venus are seen at their maximum elongation from the sun while preceding it. As they go round their orbits, they precede the sun less and are eventually 'overtaken' by it. They then gradually go to the other extreme of following the sun, and then begin to catch the sun up again and eventually overtake it again. As Mercury and Venus have different speeds of orbit, they will overtake and be overtaken by each other as well; that is, sometimes Mercury will precede Venus, and sometimes Venus will precede Mercury.

39a *though in fact they were overtaking them*: there may be a critique of Democritus here. According to Democritus, the nearer celestial objects are to the earth, the less they are carried around by the vortex (Democritus' views are reported by Lucretius at *De Rerum Natura* 5. 621ff.). So the moon, the nearest body to the earth, moves most slowly and is left behind most. This creates the greatest difference in motion relative to the fixed stars, so the moon (on this theory) appears to move swiftly relative to the fixed stars, completing a circuit in a month, when actually (on this theory) its absolute motion is the slowest. Plato changes this. The fixed stars still move the most rapidly, but the sun, moon, and planets now have their own motions (so they are no longer 'left behind' in a vortex), and the most rapid of them completes its motion relative to the fixed stars in the shortest time, so now the moon has the most rapid motion. There is another interesting consequence of Plato's combinations of regular circular motions. If there is a single vortex, one can see how the fixed stars will be swept around by it. One can also see how there will be some relative motion between sun, moon, and planets and the fixed stars, if the former are to some extent 'left behind' by the vortex. But if sun, moon, and planets are thought to have

a combination of two circular motions, these motions having different axes, how can that be accounted for in one vortex with one axis of rotation?

39d *constitute time*: if the motions of the planets constitute time, and these motions are irregular, then time will be irregular. So, however complex the motions of the heavens, they must be regular.

39d *perfect year*: if there is a specific amount of time between grand conjunctions, then celestial motion must be regular, or we are left with the highly improbable alternative that the irregular motions somehow cancel each other out. In that case, the great year would lose its significance as a sign of the rational ordering of the universe. If the great year recurs—and there is no suggestion in *Timaeus* that it does not—then celestial motion must be regular and the solar system stable and free from any degeneration. The predictable recurrence of the great year is a sign of cosmological stability.

40a *mostly out of fire*: the stars are rounded, made of fire for the most part, and each has intelligence set in it. Plato does not have a spherical shell in which the stars are embedded, as with some later cosmologies. The stars keep formation due to each having an intelligence.

40b *winding around*: the earth is generally taken to be central and immobile in Plato, as in all Greek thinking prior to Plato with the exception of the Pythagoreans. What winding or turning motion might the earth have? Two older ideas, that the earth orbits the centre of the cosmos, or moves up and down on the central axis of the cosmos, have now generally been rejected, as the objections to them are, to say the least, considerable. As we saw earlier, there is a careful division of the same in order to produce orbits for the sun, moon, and five planets. If the earth orbits the centre of the cosmos, why is there not a division of the different for it? If the earth is not at the centre of the cosmos, what is at the centre of the cosmos? There is no reason here to suppose that Plato is thinking of any sort of Pythagorean system with a central fire, as no central fire and no counter-earth are mentioned. The earth is supposed to define and guard time, which it would have trouble doing if it has either of these motions. It is very hard to see what would motivate Plato to have the earth in motion around the centre of the cosmos. It would not help the astronomy of *Timaeus*, there is no physical necessity for the earth to move in such a manner, and it would not help to explain any physical phenomena.

Cornford (*Plato's Cosmology*, 130ff.) suggested that there is a sense in which the earth might be said to have motion, while in fact it stands still. If the entire cosmos is rotating, then, in the absence of any other consideration, the earth would rotate with it, especially as the world-soul permeates the cosmos from the centre to the extremes, including the

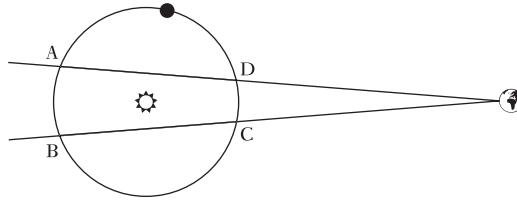
earth (36e). But this fails to allow for the existence of night and day, as the earth would be rotating at the same rate as the cosmos. The earth, in the absence of any other consideration, may rotate on its own, like the stars and the planets. If the earth's own rotation is equal and opposite to that of the cosmos, then the earth would stand still. There are other possibilities here. The cosmos might have an absolute rotation of less than once a day, with the earth rotating in the opposite sense, giving a relative rotation of once a day between them. Similarly, the cosmos might have an absolute rotation of more than once a day and the earth a smaller rate of rotation in the same sense, again giving a relative rotation of once a day between them. Cornford's proposal is attractive as it is simple, and allows the earth to be stationary and the cosmos to have an absolute rotation of once a day. The objection that this proposal ignores the different does not carry great weight. While everything is subject to the motion of the same—or, put another way, all the components of the intelligent whole of the cosmos rotate with the cosmos—only certain components of the whole (moon, sun, five planets) are subject to the motion of the different. The stars are not subject to it, and even though its motion is centred on the earth, the earth need not be subject to it.

A different solution here is to argue that we should read *eillomenēn*, 'packed around' rather than *illomenēn*, 'winding around'. If the earth is simply 'packed around' the central axis, then there need be no question of its motion.

40c *turn back on themselves and go forward again*: Plato appears to be aware of the retrograde motion of the planets. This is certainly the most natural reading of *epanakuklēseis*, literally a 'circling back', in this context. The planets move relative to the fixed stars, but will occasionally stop relative to the stars, move backwards, stop again, and move forwards again: see p. xli.

40c *conjunction and opposition with one another*: Plato may also have good knowledge of what happens when planets pass each other, depending on whether he uses different words to refer to one or several phenomena here. When planets pass each other, there are three things which may happen: they may pass each other with sufficient distance between them that they remain two distinct objects; they may 'touch' each other, such that they appear to be one brighter object; or one may pass in front of the other and occlude it.

40d *veiled from our sight and then reappear*: Plato was aware of Mercury and Venus 'overtaking and being overtaken by' the sun (see 38d). He may well also be aware of another phenomenon, which is that Mercury and Venus are not visible when they are close to the sun. They disappear from view as they approach the sun and reappear on the far side. This was a phenomenon much studied by Babylonian astronomers.



A–B and C–D are sections of the planet's orbit where it would be invisible due to its proximity to the sun.

40d *without visible models*: Plato may have had some form of rudimentary armillary sphere to help him envisage the motions of the heavens.

40e *implausible and illogical*: Timaeus seems to have his tongue in his cheek.

41a *gave birth to further offspring*: genealogies of the gods were typical in Greek mythology; see e.g. Hesiod's *Theogony*.

41a *anything created by me is imperishable unless I will it*: Timaeus here expresses the view that the cosmos is dissoluble, but will not in fact be dissolved because of the goodness of the demiurge. This is significant as a statement of the long-term stability of the cosmos. *Timaeus* differs from *Statesman* in this respect.

41b *a mark of evil*: this passage seems to have provoked Aristotle, who attempts to demonstrate that whatever is generated can also undergo destruction, and whatever is not generated cannot undergo destruction, and that there is nothing which is generated which is everlasting (*On the Heavens* I. 12).

41b *remain yet uncreated*: the three kinds are creatures of the air, water, and earth (39e–40a), but since they all develop by reincarnation from human beings (42b–c, 91d-92c), Timaeus focuses in what follows on the creation of human beings.

41c *imitate the power that I used*: human beings and all other earthly living things are to be made by the demigods that the demiurge has created, not by the demiurge himself, though the highest part of the human soul will be generated by the demiurge, and it will then be the job of the demigods to house this soul.

41d *lower in the scale of purity*: the demiurge generates human souls in a manner analogous to that in which he generated the soul of the cosmos, but the mix of sameness, being, and difference is not quite as good. It seems that the same harmonic proportions are employed. This is not made clear here, but at 43d we find that these proportions are disrupted by sensation when the soul is first given a body.

41e *planted each of them in the appropriate instrument of time*: one human soul is paired with one star. The human soul will come to earth to be

embodied, and may, if it lives a good life, return to its star. Although each human soul is assigned a star, the stars themselves are ensouled by the heavenly gods. The cosmos as a whole has a soul and spins on one spot. The stars (including sun, moon, five planets, and probably, in a slightly odd sense relating to 40b, the earth as well) all spin and have other motions as appropriate. If they did not have these divine souls, they would not spin in a regular manner nor have other motions in a regular manner.

42a *come to be called 'male'*: it was usual in ancient Greece for the male to be considered superior.

42a *powerful properties*: that is, properties that are powerful enough to penetrate the insensitive body and be registered by the soul: see *Philebus* 33d–34a.

42b *in control of these things or were controlled by them*: an important theme in the *Timaeus*' psychology is that humans should be in control of their sensations and emotions rather than be controlled by them. If they control them, they will lead a good life.

42c *become a woman instead of a man*: compare this cycle of incarnation with *Phaedrus* 248c–e and with the Myth of Er at the end of *Republic*. It is notable again that any woes that befall a soul are its own fault and the downward cycle of man to woman to animal can be reversed by that soul. Timaeus says more about this degeneration at 90e. Not surprisingly, 42d tells us that the first condition is the best condition for humans, and adds the important principle that the demiurge is not responsible for any wrongdoing by humankind. The demiurge is wholly good and free from jealousy, and so wants only the best for human beings. He sets everything up so that they can achieve good things in life, but if humans fail to do so it is not his fault.

42d *its original, best state*: our minds are at their best before they are bound into our bodies and subject to sensations and emotions. It is this sort of state we can seek to achieve by controlling our sensations and emotions.

42e *govern and steer*: see also 90a, and the Myth of Er in *Republic* on each person having his own personal deity in life.

42e *he resumed his life in his proper abode*: it would be wrong to impose onto Plato here the terms of the seventeenth-century debate between Newton and Leibniz. Leibniz argued that an omnipotent god would produce a universe which had no need of his subsequent interference; the belief that god 'needed to wind his watch' detracted from the notion of god and led to atheism. Newton, through his intermediary Samuel Clarke, replied that god could hardly be an 'absent landlord' and must care for his creation, and so must interfere with it; any other view would lead to atheism. But Plato lacks the notion of omnipotence. The demiurge still cares for the cosmos (it will not be dissolved except through his will),

even if he returns to his proper place. He has delegated to the lesser gods much of the running of the cosmos, and not least the way that the heavens move. Later in antiquity thinkers concerned themselves with questions such as why, if the cosmos is generated, does god choose this specific moment to generate the cosmos rather than any other? What was god doing prior to the generation of the cosmos? More subtly, did the generation of the cosmos entail any change of mind on god's part? Does generating the cosmos change god? Christian theologians took up many of these issues, with St Augustine's work probably being the pinnacle of this tradition.

43a *together with countless rivets*: the lesser gods begin the process of making humans by placing the 'immortal principle' in a body made from earth, water, air, and fire, and by unifying the body with many rivets. So the 'revolutions' of the human mind will now become prone to the problems affecting the body.

43c *'sensations'*: as elsewhere in the dialogues, Plato is trying out an etymology — but here it is completely unclear what etymology of *aisthēseis*, sensations, he is getting at.

44b *things increasingly return to normal*: when the stream of nutrition lessens a little, the revolutions can stabilize and pursue their natural path. When they do this, they can make correct attributions of sameness and difference. This makes the soul intelligent. There does not seem to be a limit on what humans can achieve here if they have proper nurture and education. Indeed, this should be the goal of life, rather than limping through life and returning to Hades unfulfilled.

44d *In imitation of the rounded shape of the universe*: this keeps up the macrocosm–microcosm analogy between man and the universe.

44d *vehicle and means of transport*: see p. xviii for this as possibly criticism of Empedocles.

45b *to enable the soul to be fully aware*: this too may be aimed at Empedocles: see Fr. 61 quoted on pp. xvi–xvii. According to Plato, the gods organize the human body with the face and body pointing forwards. If human parts meet by chance, as Empedocles had argued, how plausible is it that all the parts fit in exactly the right way? Empedocles' reply might have been that though there are mismatches, it is only when beings capable of reproduction are formed that species are generated.

45b *flow through the eyes*: Plato believes that vision is the result of the interaction of light flowing out through the eyes and light in the external world.

46a *mirrors or any other reflective surface*: a consequence of the theory of vision is being able to explain why, in mirror images, left appears right and right appears to be left. There is also a discussion of this topic at *Sophist* 266c.

46c *contributory causes*: this could have come straight from the 'autobiographical' passage of *Phaedo* 96a ff. There are contributory causes, but most people wrongly take them to be the sole causes, when they should be considering teleology.

46d *cooling things down and heating them, or thickening and thinning them*: cooling and heating is possibly a reference to Anaximander (see ps.-Plutarch, *Stromateis* 2), while thickening and thinning is possibly a reference to Anaximenes (ibid. 3). But the attack is quite general: none of these processes are capable of acting with intelligence, nor are any of the traditional four elements. This is an important critique of a good deal of presocratic cosmogony. One might try to explain how a cosmos is formed by attributing to a fundamental substance or process the capacity to direct things. Anaximander believed that his Unlimited 'steers', while Anaximenes may have held a similar view about air (his follower, Diogenes of Apollonia, certainly did). If one rules out this kind of possibility, as Plato seems to do here, one is left with an external god imposing order, or with supposing the cosmos to have come into being through chance. The final comment in this passage is also critical for Plato's notion of cosmogony. There are causes which will produce only disorderly and chance effects, but without intelligence causes will produce nothing of any worth; this rules out the possibility of chance generating a cosmos.

47b *the rational revolutions of the heavens*: it is from our observation of the heavens that we have derived number and all philosophy, so it is no great surprise that this is the greatest gift from gods to men. On some readings of *Republic* VII, though, this passage comes as a considerable surprise. If Plato bans or denigrates observational astronomy in *Republic*, what of this passage? Is this a change of mind? As argued in the Introduction, Plato does not ban observational astronomy in *Republic* VII, but rather draws a distinction between how astronomy is done now and how the guardians ought to use astronomy in their education.

47c *the perfect evenness of the god's:* there is a contrast between the entirely unwandering motions of the mind of god and the wandering motions in our own heads. Here is very strong evidence that stars, sun, moon, and planets move in a perfectly orderly manner.

47c *sound and hearing too*: sound, here meaning speech and music, is another gift from the gods for the same general purposes as eyesight. It allows us to bring the disorderly motions within our own heads into order. It is interesting and perhaps significant that here we have the same order (sight, hearing, music) as we do at *Republic* 530d. If the previous section on sight gives us at least a different emphasis on the benefits of eyesight, and another role for astronomy, here we have similar moves for hearing and harmony.

47e *digression*: 45b–46a.

47e *an account of the creations of necessity*: Timaeus signals very clearly a shift from talking about the products of intelligence to the products of necessity. There will be a similar clear shift to talking about the products of a combination of reason and necessity at 69a.

48a *towards perfection*: see pp. xlvii–xlix on the relation of intelligence and necessity.

48a *wandering cause as well*: 'Matter, having no inherent tendency toward good ends, acts in a purposeless way unless it is directed, or in Timaeus's preferred idiom, "persuaded", by intelligence' (Sedley, *Creationism and Its Critics*, 114–15).'

48b *how they were created*: or at least it has not been explained to Plato's satisfaction. Some thinkers (e.g. Thales, Anaximenes, Heraclitus) took one 'element' (respectively, water, air, fire) as basic and outlined how it might be changed into the others, but they left unexplained the origin of the basic element.

48b *compared to syllables*: *Timaeus* will give us a version of the letters-and-syllables analogy which is common in later Plato (*Theaetetus* 201d ff., *Statesman* 277d ff., *Sophist* 253a ff., *Philebus* 18b ff.). Plato employs the analogy to illustrate not only something about the nature of language, but also, arguably in some or all of these cases, about the nature of the world. Plato is often interested in which letters do or do not combine to make syllables, and is concerned with the bonds between letters (see *Sophist* 253a, *Philebus* 18c). Why do earth, water, air, and fire not even constitute syllables? If we glance ahead for a moment to geometrical atomism, the 'letters' are taken to be the two basic triangles. These form either squares or other triangles, which figures in turn then form a cube of earth, a tetrahedron of fire, an octahedron of air, or an icosahedron of water. Any perceptible amount of earth, water, air, or fire will contain a considerable number of these three-dimensional figures. No one of any sense, then, would call earth, water, air and fire even syllables, let alone consider them to be letters.

48c *such a conception*: several presocratic philosophers did identify one element as fundamental and basic: see the first note to 48b.

48e *start again from the beginning*: Timaeus calls upon the gods as he did at the outset of his discourse, reaffirms the likely nature of the account, and begins a new line of thought.

49a *this difficult and obscure kind of thing*: from the outset Plato recognizes that the receptacle is difficult to describe.

49a *the receptacle (or nurse, if you like) of all creation*: it is never made clear in what sense the receptacle is a 'nurse'. It is possible to take it as a material metaphor, whereby the 'nurse' is a wet-nurse, giving material sustenance to what comes to be in the receptacle, but there is nothing

that compels us to take the metaphor this way. Another possibility is that the receptacle is a nurse in the sense of rocking its charges: the use of the word at 52d leads up to the description of the receptacle shaking the things that are in it, and 88d has the 'nurse and the nurturer of the universe' always moving and agitating the cosmos.

49b *by all four names, one after another*: if earth, water, air, and fire all change into one another, as was perfectly possible in most ancient theories of the elements, and indeed was a common view, which of them is more basic than any other?

49c *water in turn gives rise to earth and stones*: one can find explanations of this type in many presocratic thinkers. They originate in Egyptian and Babylonian cosmogonies, which were impressed by the observation of the annual flood receding and revealing new land.

49d *'something of this sort'*: the translation and interpretation of this passage have been much disputed. Debate centres on the phrase, *mē touto alla to toiouton hekastote prosagoreuein pur*.

The traditional reading is that *touto* ('this') and *to toiouton* ('suchlike') are competing predicates for the subject *pur*, fire. The phrase then concerns ways in which we may talk of fire, one proper and one improper: we ought not to call phenomenal fire 'this', but we can call it 'suchlike'.

The alternative reading takes *touto* and *toiouton* to be competing subjects for the predicate *pur*. This then reads, 'do not call this (phenomenal fire) fire, but do call what is each time "the suchlike" fire'. On this reading the sense is that words such as fire, which we now apply to transient phenomena, are better applied to more stable entities. So if we are to use 'fire' properly, we should only use it to refer to entities which are 'this', and not those which are 'suchlike'.

On the traditional version we can call phenomenal fire 'suchlike', so it is permissible to call this phenomenon 'fiery' or 'fire-like'. Forms and the receptacle, however, as they are unchanging, can have normal names and can each be regarded as a 'this'. On the alternative reading, we are not told how we can refer to phenomenal fire, only that it cannot be called 'fire'. We can call 'what is each time suchlike' fire, though it is not clear what 'what is each time suchlike' might be. Both of these interpretations are acceptable renderings of the Greek. Which we choose to accept, however tentatively, will depend on more general considerations. Here are two:

(1) A major concern over the traditional reading was the apparent discord between *Timaeus* and *Theaetetus*. It has been argued that *Theaetetus* postdates and corrects *Timaeus*' view on the relation of flux and language (G. E. L. Owen, 'The Place of the *Timaeus* in Plato's Later Dialogues' (1953), repr. in R. E. Allen (ed.), *Studies in Plato's Metaphysics* (London: Routledge & Kegan Paul, 1965), 322 ff.). It is surely true, so Owen argued, that if everything is in radical flux, we cannot successfully refer

to anything at all, and this is a better position than the 'lame plea' of *Timaeus* 49d ff. that we can refer to the four elements as 'the suchlike'. The alternative view was pioneered by H. F. Cherniss, 'A Much Misread Passage in the Timaeus (49c7–50b5)' (1954), repr. in Cherniss, *Selected Papers* (Leiden: Brill, 1977), 346–63). The key passages in *Theaetetus* are 182c ff. and 183a ff. The flux described there is very radical. If something is always in motion and always changing all of its characteristics all the time, then we cannot refer to it at all (cf. *Cratylus* 439d). However, it is not clear that *Timaeus* envisages the world being in so radical a flux. Some passages can be interpreted in that way, but it is not necessary to do so. Nor is it clear that Plato is committed to a radical flux in *Theaetetus*.

(2) A major concern with the alternative reading is what things are 'each time suchlike' that we can call, for example, fire? Clearly not the phenomena, nor the receptacle, nor, it would seem, forms. The 'suchlike' entities are explicitly said to enter and leave the receptacle (49e ff.), which forms explicitly (52a) do not do. This leaves the alternative reading supposing some fourth kind of thing, beyond forms, receptacle, and phenomena, where *Timaeus* is explicit that there are three. As Plato never explicitly says anything of this fourth kind, the alternative reading seems somewhat unnatural.

49e *refer to fire as 'something that is regularly of this sort'*: when we see what we had previously called 'fire', we should call it 'fiery' instead; we should not identify it as 'fire', as it will change to something that is not fire, but we can say that currently it is 'fiery'.

50a *and from which it subsequently passes away*: we can refer to the receptacle in this manner, as it is stable, but not to what occurs in it, which is liable to change. The 'from which it comes and into which it is destroyed' formula that Plato uses here was applied by some presocratics to the element which they considered to be basic.

50b *in fact they're changing even while they're being identified*: to be safe, we must call what we have here 'gold', rather than name any shape the gold may be in. Analogously, the safest thing to do is call anything 'receptacle' (i.e. that which does not change which underlies the changes), rather than call it by any name we currently give to transient phenomena.

50c *appears different at different times*: the receptacle can only *appear* to be different at different times. If it were to change in its own nature, we would need to look for something unchanging which underlies that change in the receptacle.

50c *later*: this promise is never fulfilled.

50e *altogether characterless*: that the receptacle is entirely characterless is required by this line of argument, but gives rise to a problem. How can one either grasp or talk about something that is entirely characterless? See 52a–b.

51b *It's almost incomprehensible*: throughout this passage Timaeus is aware of the difficulties of giving an account of the receptacle.

51b *Is there such a thing as fire which is just itself?*: this question cannot be ignored, but cannot be treated at length either in this context, so we get a brief argument only. It is remarkable that forms have not been mentioned or argued for until now. We might take them to be implicit in the distinction made at the outset of Timaeus' discourse (between what is, is stable, and is apprehended by intellect and what becomes, changes, and is perceived), but this is their first explicit mention.

51d *if knowledge and true belief are two distinct kinds of thing*: it is an important tenet of Platonism that knowledge and true opinion are very different, and Timaeus goes on to summarize why. Compare 27d ff. on the differences between what is and what becomes.

52a *there is space*: this is the first time that the receptacle has been referred to specifically as space.

52b *hardly credible*: it is difficult to talk about something as characterless as the receptacle. If the receptacle is neither intelligible, nor perceptible, it is also difficult to apprehend. This gives it a rather odd epistemological status.

53a *those that were most similar were pushed the closest together*: the shaking of the receptacle produces a like-to-like sorting. There were hand-held baskets which were used in agriculture for sorting grain, oats, barley, and the like. When shaken, they sorted seeds of similar density together. Cornford, *Plato's Cosmology*, 201, has a good illustration.

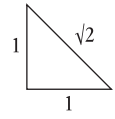
53b *with no god present*: the pre-cosmic chaos is non-progressive. Although there is a like-to-like sorting, this is not enough to produce a cosmos. See pp. xvii–xviii.

53b *use shapes and numbers to assign them definite forms*: an important theme in *Timaeus*, both in the cosmology, where the orbits of the heavenly bodies are given shape and number, and here in the theory of matter as well. Hence the demiurge may be called a geometer god.

53b *as beautiful and as perfect as they could possibly be*: Timaeus restates another important theme, familiar from 30a.

53c *consists of triangles*: the restriction to *rectilinear* plane figures has no logical basis and is designed purely to lead into what follows.

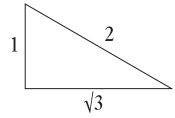
53d *half of a right angle which has been divided by equal sides*: the first of Timaeus' two basic triangles, then, is like this:



53d *two parts by unequal sides*: the other type of basic triangle is to be a scalene triangle, but we are not yet told which of many scalene triangles is going to be used.

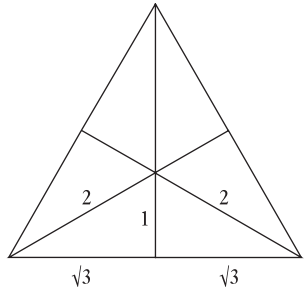
53e *more perfect visible bodies than these four*: the four that will be chosen are the cube, the tetrahedron, the octahedron, and the icosahedron. All these are known as Platonic solids, and are constructed from identical faces (the cube from six identical squares, the tetrahedron from four identical triangles, etc.). There are very few solids with these properties.

54b *triple the square of the shorter side*: there are an unlimited number of scalene triangles, so Timaeus chooses the best, which he takes to be the scalene which is half of an equilateral triangle. This is one advantage of Plato's teleology, that when faced with a choice from an unlimited field, the best can be chosen. The drawback here is in defining criteria for what is the best, and Timaeus has little to say on this, other than some cryptic remarks about the construction of the four best solid bodies for earth, water, air, and fire.



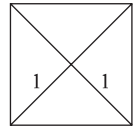
54c *Only the three can do that*: Timaeus now clarifies whether all the bodies can transform into each other. Going back to 49b ff., it appeared that earth, water, air, and fire could all transform into each other, but this is illusory. Three of the four types (water, air, and fire, though they are not mentioned specifically here) can transform into each other, being constructed from one type of triangle; the fourth type (earth) cannot, being constructed from the other type of triangle.

54e *a single equilateral triangle made up of six triangles*: Timaeus now begins to construct complex triangles, with the intention of generating the simplest solid. The first is an equilateral, made up of six basic scalene triangles.

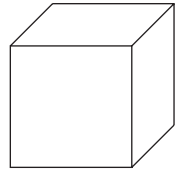


55a *Four of these solid angles form the first solid figure*: out of these complex equilateral triangles, certain solid bodies can be made—first the tetrahedron, and then in what immediately follows the octahedron and the icosahedron. 'The angle that comes straight after the most obtuse possible plane angle' is an overly precise way of saying '180° angle'.

55c *The resulting construct had the shape of a cube*: first, the second type of triangle forms up in fours in squares:



Then these squares form cubes:



55c *used it for the whole*: so far, Timaeus has used four bodies of a certain type, all constructed from faces of the same size and shape. There is another figure of this type, the dodecahedron. This cannot be constructed from either of the two basic types of triangle and is not required for the theory of the elements. It is unclear what Timaeus means when he says that god 'used it for the whole'. It is possible that it is used for the earth, with reference here to *Phaedo* 110b and the comment that the earth is like a ball made of twelve pieces. I find this unlikely, especially as it makes little sense of the phrase about decoration, which can also be rendered as 'covering with animals', which might well be a reference to constellations. So perhaps the dodecahedron is used either for the zodiac or the cosmos as a whole, though it is hard to see the connection with either, especially as the cosmos is specifically described as spherical.

55d *a boundless plurality*: there were ancient thinkers who did believe in a boundless plurality of worlds, most notably, prior to Plato, Leucippus and Democritus.

55d *five worlds*: five worlds corresponding to the five Platonic solids.

55e *a square is more stable than a triangle*: the most stable of the solids we have generated is assigned to earth, which is perceived to be the most stable of the four elements. Timaeus uses similar principles to assign the three remaining figures to the three remaining elements.

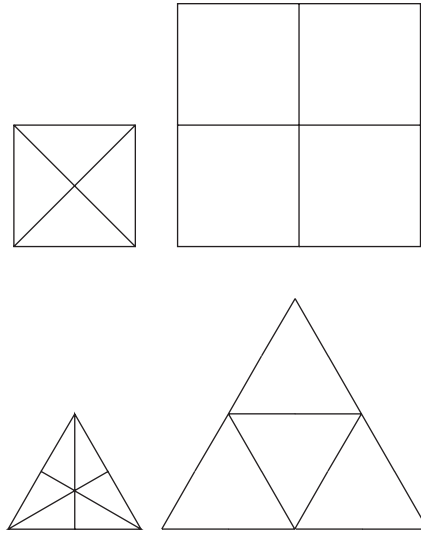
56c *lumps made up of a lot of them all at once*: it is no great surprise that individual elemental bodies are too small for us to perceive, but is also quite significant. While what we perceive may change, what is below our threshold of perception may have greater stability.

56e *into a single complete water-figure*: Timaeus begins his account of the transformation of the elements. Earth cannot transform into the others, as we have seen, but it can be affected by the others. This passage is significant in that it seems to imply that cubes of earth can be broken up, and then recombine at some later stage. This would imply that there can be 'loose' faces and perhaps even 'loose' triangles for some considerable time, not just in the transformation of, say, water and air.

57b *fire turns into air, or air into water*: where we have two unlike substances, the weaker will be assimilated by these transformations into the stronger.

57c *by the movement of the receptacle*: the shaking of the receptacle mentioned at 52e ff., which produces a like-to-like sorting.

57d *engendered a triangle of just a single size*: the basic triangles come together to form either squares or equilateral triangles. The squares and equilateral triangles can have different sizes, depending on how they are made up. So we can put four squares together to get a bigger square or, four equilateral triangles together to get a larger equilateral triangle. Other combinations of this type, resulting in other sizes of square or equilateral triangle, are possible. The larger sizes join up to form solids of a larger size.



58a *already discussed*: presumably Plato is thinking of the 'inequality' between all the different elementary triangles.

58a *every last bit of void*: circular motion does not produce this compressive effect, but ancient scientists inferred that it did from observation of how a whirlpool moves objects to its centre (Aristotle, *On the Heavens* 295a ff.).

58b *gaps within the large bodies*: the solids that Plato supposes for the elements cannot fit together to fill space completely. The compressive effect of the revolution of the whole, though, will push them together so that the smaller particles fill the spaces as best as possible. It is hard to believe that Plato was not aware that his theory of atoms and how they move and change implied that there must be gaps between atoms and spaces when they change. Certainly Aristotle is aware of this sort of problem (*On the Heavens* 306b3 ff.).

59a *'cooling' . . . 'solidification'*: the idea that fire is a substance, and that its presence brings heat and its leaving produces coolness, had a long history. Even when eighteenth- and nineteenth-century scientists broke with the ancient idea of fire as an element, they substituted first phlogiston, a substance with weight that carried heat, then caloric, a substance without weight that carried heat. The modern idea of heat as the rapid motion of particles dates from the mid-nineteenth century.

59c *its constituent earth and water*: the ancient elements of earth, water, and air can be thought of as principles of solidity, fluidity, and gaseousness. This is important for understanding the supposed composition of some materials. Materials that did not melt when heated (e.g. stones) were thought to be composed almost entirely of earth. Materials that did melt, such as metals, were thought to be composed of earth and water, water explaining the fluidity of the heated metal.

60b *their normal, loose-textured state*: this fits with one of the general ideas of this section of *Timaeus*, that pleasure is associated with the return to a normal state.

60c *the new air pushes at the adjacent air*: should air be able to push air, according to the principles laid down at 57d ff.? Plato explains at 61a that if air is compressed, nothing dissolves it.

60c *the more beautiful kind*: crystals.

60d *dark-coloured millstone*: millstones were often made out of lava.

62a *its name*: Plato seems to want to link 'heat' (*therm-* words) with 'cutting' (*kerm-* words).

62d *altogether incorrect*: this passage is significant for its rejection of a type of cosmology. Much early Greek cosmology was of the 'parallel' type (on this see D. Furley, *The Greek Cosmologists*, vol. 1: *The Formation of the Atomic Theory and its Earliest Critics* (Cambridge: Cambridge University

Press, 1987)), in which heavy objects drop from the 'top' of the cosmos to the 'bottom'. Hence the problem Thales has with the question of why the earth does not drop, and what supports the earth. Gradually a new type of cosmology took over, the 'centrifocal' type, most clearly typified by Aristotle, where there is a central point of the cosmos to which heavy objects move. Plato played a significant part in the transition.

62d *it's just in the centre*: so in Timaeus' cosmos there can be no up and down. The cosmos is spherical and the opposite of a point on the extremity is the point in the centre. Note, however, the careless use of 'up' at the beginning of 60c.

63d *we use 'heavy' and 'down' for the opposite property and place*: the basic principle here is that of like to like. If we forcibly shift earth away from the mass of earth, it will attempt to return and so feel heavy. Plato's account here, though centrifocal, is different from Aristotle's. For Aristotle, earth moves naturally to the centre of the cosmos, not to its own kind. If the earth in the cosmos were gathered elsewhere for Plato, earth would move to this other place. Aristotle's distinction between heavy and light is also more absolute, based on whether elements move naturally towards or away from the centre of the cosmos. For Plato this is relative, depending on the situation of the gathered mass of an element. While this may all seem a little odd and archaic, universal gravitation is not the easiest of ideas to develop. Certainly no one in the ancient world came close to it, and it required the work of many hands to develop it into a coherent theory in the seventeenth century. The Newtonian account involving attraction at a distance only won out over the Cartesian account involving vortices in the mid-eighteenth century.

64c *bones and hair*: those parts of the body that are composed mainly of earth do not pass on motion to the soul, and so perception does not occur.

65b *observed when the body is burnt and cut*: where the normal state is disrupted slowly or restored slowly, no pain or pleasure is felt. It is possible for the normal state to be disrupted slowly, with no pain, and restored rapidly, with pleasure; and for the normal state to be disrupted violently and with pain and restored slowly without pleasure, as in the case of burns. Compare *Philebus* 31d ff. on the nature of pleasure.

66d *too broad for fire and air*: the account of smell is unsatisfactory. The passages with which we smell are said to be too fine for earth and water, too large for air and fire, so these elements cannot be smelled in their pure form. That seems odd for air and fire, which could easily collide with the walls of the passages rather than pass straight through. It is also odd in that there may be larger sizes of the elements (e.g. cubes of earth with sixteen rather than four triangles per face), which should then either be smellable or even too large for the passages.

67c *great and small movements*: a stroke is transmitted from the air through the ears to the blood and brain, and is then passed on to the soul. The motion this causes, from head to liver, is hearing. The eardrum appears to play no part in this account. Pitch is related to speed, 'smoothness' (as opposed to 'harshness') is related to uniformity, volume is related to magnitude.

67c *later stage of the discussion*: 80a–b.

67c *fourth and final*: of our canonical five senses Plato omits touch, though he discussed tactile qualities in 61d–64a.

67c *how sight occurs*: see 45b–46a.

67e *'white' is what expands the visual ray, and 'black' is the opposite*: Plato refers back to his theory of vision as the interaction of two streams, one from the eye and one from the outside world; see 45b ff.

68a *'bright' and 'shiny'*: we would not describe 'bright' and 'shiny' as colours, but as qualities or intensities of light. Plato treats them like colours, though, as he describes the mixing of colours with 'bright'.

68b *the result is orange-yellow*: there are two difficulties in trying to understand Plato's theory here. First, Greek colour terms do not match up in any simple way with our own. Quite often the Greeks would emphasize hue rather than colour, so the description 'wine-dark' might be used of the sea or of sheep, and the word for 'black' also means 'dark-hued'. Secondly, it is not always clear in this section whether Plato is talking of the effects of fire particles on one another or the effects of mixing pigments together. If Plato is talking about pigments, we don't know specifically which pigments (that is, what the pigments consisted of) or how they would interact with each other when mixed. So some of his results seem strange to us.

68e *fathering the self-sufficient, perfect god*: i.e. the universe. Timaeus is moving towards a conclusion for this part of his discourse, and so recapitulates what the demiurge has done with the chaos he began with at 53b. The demiurge is responsible for everything good that has come out of the primordial chaos.

69a *apart from necessary ones*: compare 46e on divine and contributory causes, and *Phaedo* 99a on the relative importance of contributory and divine causes.

69a *the rest of our account*: while so far we have had a section on the works of intelligence and on what happens by necessity, in the third and final section we have an account of intelligence combined with necessity.

69b *proportionate and compatible*: as at 53b, where the demiurge imposes shape and number on the primordial chaos.

69b *except by chance*: Plato sees chaos as non-progressive. A body may, by chance, attain the characteristics of an element, but will lose those characteristics just as easily.

69d *pleasure, evil's most potent lure*: compare *Philebus* on the relation between pleasure, hedonism, and the properly good life.

69d *constrained by necessity*: if the soul is to be placed in a body, there are some unavoidable consequences, and inevitably the soul will be racked by assorted emotions and passions. This is a necessary constraint on how we are constructed.

70a *the diaphragm as a barrier between them*: the diaphragm separates the chest from the abdomen. It helps us breathe, and is continuous, except where it allows the spine, intestines, and blood vessels through.

70a *the dictates of reason issuing from the acropolis*: here we have an example of intelligence and necessity, seemingly of the logical kind. The mortal and immortal soul must be housed in the same body but it is best to keep them as far apart as possible, so they are housed in different parts of the body. Thus 'reason persuades necessity' as far as possible, though having mortal and immortal soul in the same body is necessary. The language of 'parts' of the soul is taken from *Republic* 436a ff., as is the theory that the soul consists of three predominant parts—a reasoning part, a passionate, defensive part, and an appetitive part.

70b *the blood that circulates vigorously throughout the body*: Plato did not believe in the circulation of the blood in the same way that we do, in the sense of a flow from the heart, through the arteries, through the capillaries, through the veins, and back to the heart. He did believe, however, that blood was transported around the body, and that the heart is in some sense the 'source' of blood.

70d *relief and comfort from the heat*: Plato is, of course, completely wrong here on the function of the lungs. However, ancient anatomists, while they knew the disposition of the organs, struggled to understand their function, and often believed that major organs (lungs, even the brain) existed mainly as a means of regulating heat and cold within the body. In Plato's time the lungs were thought of as a single organ, with right and left chambers.

71a *collectively and individually*: Plato uses a macrocosm–microcosm analogy between the cosmos and humans, but there is also a secondary theme, relating both the cosmos and the human body to a city. How is a city to be best governed? Like the body, it should be governed by the most intelligent and knowledgeable.

71a *bewitched by images and phantasms*: the lower the level of intelligence for Plato, the more easily will we be taken in by visual images. Compare here the cave analogy of *Republic* 514a ff., and the way that the prisoners in the cave are also prisoners of the images they see.

71b *images to look at*: in some way our thoughts are reflected on or form an image on the liver, and so will communicate themselves to our lowest parts. Since dissection of humans was not practised, it was hepatoscopy,

the dissection and investigation of animal livers for divinatory purposes, that had enabled the Greeks to know something about the liver — for instance, that it presents a considerable diversity of appearances when dissected, and that its appearance is altered by various diseases, as Plato says in what follows.

71e *some kind of contact with truth*: for humans to be as good as possible, the baser instincts are kept as far away as possible from the higher intellectual functions, but some thought is taken by the designers even for the improvement of the baser part of the soul.

72a *present trouble or benefit*: it is important that we can make rational judgements about what is presented to us in dreams, etc. Compare 42b, where the injunction is that we should control our sensations and emotions and should not be controlled by them.

72a *to know himself*: 'know yourself' is a famous dictum of Socrates, stemming from advice inscribed in Apollo's sanctuary at Delphi.

72c *clear indications of meaning*: it is not clear how Plato would support the idea that the liver in life is so different in these respects from the liver in death. At any rate, he here casts doubt on hepatoscopy, since the animal victims were first killed before having their livers examined.

72d *cleans them all up*: the function of the spleen is simply to keep the liver clean, to help even the most base type of soul see the images clearly. Actually the functions of the spleen are to produce lymphocytes which help recycle red blood cells and play an important part in fighting infections in combination with white blood cells.

72e *formation of the rest of the body*: Plato refers back to his promise at 61d to cover this topic.

73b *in the marrow*: the marrow is the starting point for the construction of the body. The soul is in some way bound into the marrow for the extent of a human's life: see 81d, where death occurs when the soul eventually is released by the marrow.

73d *the 'head'*: the Greek word for 'brain' means literally 'the organ in the head'. Plato seems to be aware that the brain is bathed in cerebrospinal fluid, and the idea that the brain is marrow works well with the idea that the soul is bound into the marrow and that the flight of the soul from the marrow is death. The marrow is also supposed to be an individual's sperm bank, just as (73b–c) the original marrow-stuff contains the seeds of all life on earth.

73d *made out of bone*: the human body is constructed in layers. First the marrow, then the bones around the marrow (the skull and spine, in the first instance), then the sinews, etc., and finally the flesh.

74a *like hinges*: there may be a specific attack on Empedocles here, in the notion that the spine is designed to be flexible. According to Empedocles,

the spine is broken into pieces by chance (cf. Aristotle, *Parts of Animals* 640a). The entire section, of course, runs contrary to Empedocles' thinking: Plato explains by design, Empedocles by a multiplicity of accidents.

75c *more sensitive and intelligent*: a good example of the relation between necessity and intelligence. Of necessity, humans must have bodies, and their minds must be housed, but intelligent design guides the construction to ensure that our heads are sensitive and intelligent rather than swathed in deep layers of bone and flesh, which might give us a longer life but not a more intelligent one.

76d *to think about the future*: the creators of human beings believed that at least some humans will fail in their lives (on the criteria laid out by Timaeus), and so they gave humans rudimentary nails that will be useful when they turn into animals in future incarnations (see 90a ff.).

77c *to move itself*: Plato follows a typical ancient distinction between plants, animals, and humans. Plants have a vegetative soul, that is, they can grow but not move from place to place or think. Animals have motion as well as growth, humans have intelligence as well as motion and growth.

77d *other parts of the body*: Plato does not know the difference between arteries and veins, and has no knowledge of the capillaries that link them. Nor does he give the heart any role in the movement of blood.

78a *permeable by smaller particles*: the principle here is important for what is to come. Bodies composed of small particles are impervious to larger particles, but those composed of larger particles are not impervious to smaller particles. One might take this to mean that there are small-scale voids. If there are interstices in the formation of larger bodies that small ones can pass through, what is in these interstices? One answer might be a constant stream of smaller particles, but as those particles neither tessellate with the larger ones nor with themselves, that still has to leave some void.

78b *like a fish-trap*: a simple but effective means of catching fish or crustaceans (there is a similar design for lobster pots). The overall shape is like a vase, with a funnel-like mouth leading into a broad body which tapers to an end. They can be made of reeds, flexible branches, or even netting strung around a skeleton of reed or branch. The fish find it easy to swim into them (and the traps were often baited), but very difficult to swim out. In relation to the body, the gods make a fish-trap with two funnels, one of which is branched into two again. This is generally understood to be a funnel each for the mouth and nose, with the nose forked into two again.

78c *into the abdomen*: the two tubes are the oesophagus and the trachea.

79c *through our porous flesh*: Plato needs to explain the sensation of breathing in and breathing out without recourse to a void. We cannot simply expel air and leave a void; air is simultaneously being drawn in through the pores of the body, and this is what makes the chest swell again and triggers an in-breath. Plato believes that the primary function of the diaphragm, the muscle wall which separates the chest and the abdomen, is to separate different parts of the soul, rather than to be a major cause of the deflation/inflation of the lungs.

80a *cupping-glasses that doctors use*: another phenomenon that can be explained by the no-void theory is the action of medical cups (to raise skin, now used only in alternative therapies). Next we see that objects which keep in motion after the mover has let them go can also be explained by the same principle. The ancients, lacking modern ideas such as momentum, struggled to explain why objects kept moving when the mover had released them. Here the idea is that air displaced by the motion of an object rushes in to fill any potential void behind a moving object, thus imparting some force and keeping the object in motion.

80b *blend of high and low pitch*: quite how the theory explains how music may be harmonious or dissonant is obscure.

80c *there's no attraction . . . and there's no void involved either*: Timaeus also wants to reject what we would call action at a distance, or attraction and repulsion. Two difficult cases here are the apparent electrostatic attraction generated when amber is rubbed, or magnetic attraction from permanent magnets. Timaeus wants to account for these by the contact action of particles. So instead of attraction across empty space, there is a close press of particles whose motion results in the appropriate bodies moving towards each other. Descartes came up with a very similar theory in the seventeenth century. The usual analogue here is a whirlpool. While an object on the surface (say a piece of wood) moves to the centre of a whirlpool, this is not due to any attraction from the centre of the whirlpool, but is rather due to the motion of the water particles.

80e *explained earlier*: 68b.

81b *universal movement*: the macrocosm–microcosm relation is being stressed again in this paragraph.

81b *at that time*: the like-to-like principle is being stressed again as well. While modern scientists tend to think in terms of fluids and nutrients being forced around the body (e.g. by the action of the heart, the heart acting as a pump), the ancients often took the view that parts of the body attracted what they needed. This sort of thinking was dominant until the seventeenth century and the discovery of the circulation of the blood by William Harvey.

81e *flies joyfully away*: the marrow includes the brain, so the higher intelligence located in the head can escape its mortal bonds.

82a *abnormal predominance and deficiency among them*: this sort of theory, that disease is due to an imbalance of crucial elements or fluids in the body, was typical of the ancient Greek world. But it turns out that Plato has three theories of disease: it may be caused by imbalance (82a–b, 86a), by decomposition (82b–84c), or by air, bile, or phlegm (84c–86a). Of these, the decomposition theory appears to be original to Plato.

83c *depending on its colour*: bile played a significant role in early theories of the constitution of the body and the nature of disease. The theory of the four humours held that there were four critical substances for the body: black bile, yellow bile, blood, and phlegm. When these four humours were in balance, the body was healthy; all diseases were due to an imbalance of the humours. For Plato, however, bile and phlegm were the unhealthy products of decomposition (83e).

84c *reverse the direction of their flows*: diseases involving putrefaction of the flesh, such as gangrene, were much more common in the ancient world.

84e *'tetanus' and 'opisthotonos'*: tetanus is actually caused by wound infection, and is an involuntary and prolonged contraction of the muscles. Typically, the contractions begin around the mouth, giving tetanus its other name of 'lockjaw'. Opisthotonos, literally a 'backward arching', involves the patient involuntarily arching his head, neck, and spine backwards. It is a symptom of tetanus, and also of meningitis. Before the advent of modern vaccines and antibiotics, tetanus was much more widespread and dangerous.

85a *air in its bubbles*: see 83c–d.

85b *the 'sacred disease'*: it is notable here that Timaeus believes the 'sacred disease' (epilepsy) to be well named, whereas the Hippocratic treatise *On the Sacred Disease* had attacked the idea that it was caused by the god, and argued for a natural explanation. Timaeus seems to agree that the disease has a natural cause, but as it attacks what he considers the highest part of a human, he allows it the name of the 'sacred disease'.

85d *combined action of the fibres and a cool environment soon causes the blood to clot*: there is a clotting agent in the blood called fibrin. It is a protein with fibre-like molecules which join together in appropriate circumstances to help generate a blood-clot. Plato would not have known this, but his ingenious theory involving blood fibres does give him a way of explaining the thickness of the blood and blood-clotting.

85e *sets the soul free*: in other words, the result is death.

86a *quotidian fevers*: quotidian fevers have daily crises. Fevers were carefully observed by the Hippocratics, who took care to note when a medical crisis

occurred. Even if they could not cure the fever, they could at least give a good prognosis, important in a situation where they had to struggle against other practitioners (herbalists, faith-healers, etc.). Tertian fevers have a crisis every three days; quartan fevers have a crisis every four days.

86c *loses the ability to think rationally*: compare 43b ff.

86e *no one is bad of his own choice*: it was standard Platonic/Socratic doctrine that no one is willingly bad.

87a *soul's three locations*: see 69c–70a.

88c *at once*: the phrase 'the beautiful and the good' started life as a single compound epithet (kalokagathos) aristocrats applied to themselves in the fifth century. Plato's paradigms, by contrast, are 'beautiful' because of their physical fitness, and 'good' because of their philosophy.

88e *what I was saying before about the universe*: just as the 'nurse' of the universe (cf. 53a), that is, the receptacle, keeps in motion and shakes what is within it (cf. 49a, 52d), so we should keep our bodies in motion and shake what is within them. This helps to ward off external attacks and internal imbalances. Notice the macrocosm–microcosm relation again.

89b *medical use of drugs to purge the body*: Plato sides with the medical theorists who opposed radical purges of the body. Ancient medicine emphasized diet and exercise as preventatives, and had little in the way of effective cures for diseases. What they did have were emetics, laxatives, and diuretics to purge the body. Whether these procedures cured or exacerbated medical conditions was a matter of debate. Here Plato considers them to be a last resort only.

89d *the application of drugs*: in some ways this passage reads rather strangely to the modern eye, but one might well ask: the gym or liposuction? Jogging or anti-depressants? Fruit, vegetables, and fish to help the immune system, or antibiotics? The issue of the efficacy (or perceived efficacy) of available drugs is still an issue.

89d *controlling and being controlled by himself*: this looks back to 42b, where if we master our sensations and emotions, we will live just lives.

90a *in proportion with one another*: compare the proportions required in the cosmos to make it the best possible (see 35b ff.), and the proportions required in the human body (see 87c ff.).

90a *suspended our heads*: human beings have a greater natural kinship with the heavens, and should make astronomy an object of special study.

90c *giving it food and exercise that is congenial to it*: this, of course, is not physical food and exercise, but the intellectual kind best exemplified by astronomy. The idea that impressions are a kind of food was implied by 43b, and is argued for at *Republic* 401b–d.

90d *to its original condition*: the best condition for humans is the one that obtained before they were bound into their bodies, when the revolutions in their heads were not disrupted (42e–44c).

90d *within human reach*: a good life is attainable, if we work for it. As ever in *Timaeus*, jealousy is not a feature of the relation between gods and humans. The demiurge wants us to have good lives, and has given us the means to attain such a life.

91a *sexual desire*: this confirms that the original population were male, as sexual desire (or at least, heterosexual desire) is generated only with the advent of women.

91d *studied the heavens*: astronomy has figured significantly in *Timaeus*. It is the means by which we can bring the imperfect revolutions in our heads in tune with the perfect revolutions of the world-soul. It is no surprise, then, to be told that those who ignore philosophy and astronomy become brutish. But practising astronomy superficially is not good enough. We must not only observe, but must think about the heavens in a serious fashion.

92a *the most mindless of them*: there is a hierarchy among brutes, and the most mindless humans are reincarnated as snakes. It is apt that those who have reached the lowest levels of intelligence should be assigned to the lowest places on earth.

92c *their losing or gaining intelligence*: although this sequence has been given as a descent, there is also the possibility of ascent. If someone should live a life of one of the lower creatures in a virtuous manner, attempting as far as possible to gain knowledge and intelligence, she will be reincarnated further up the scale.